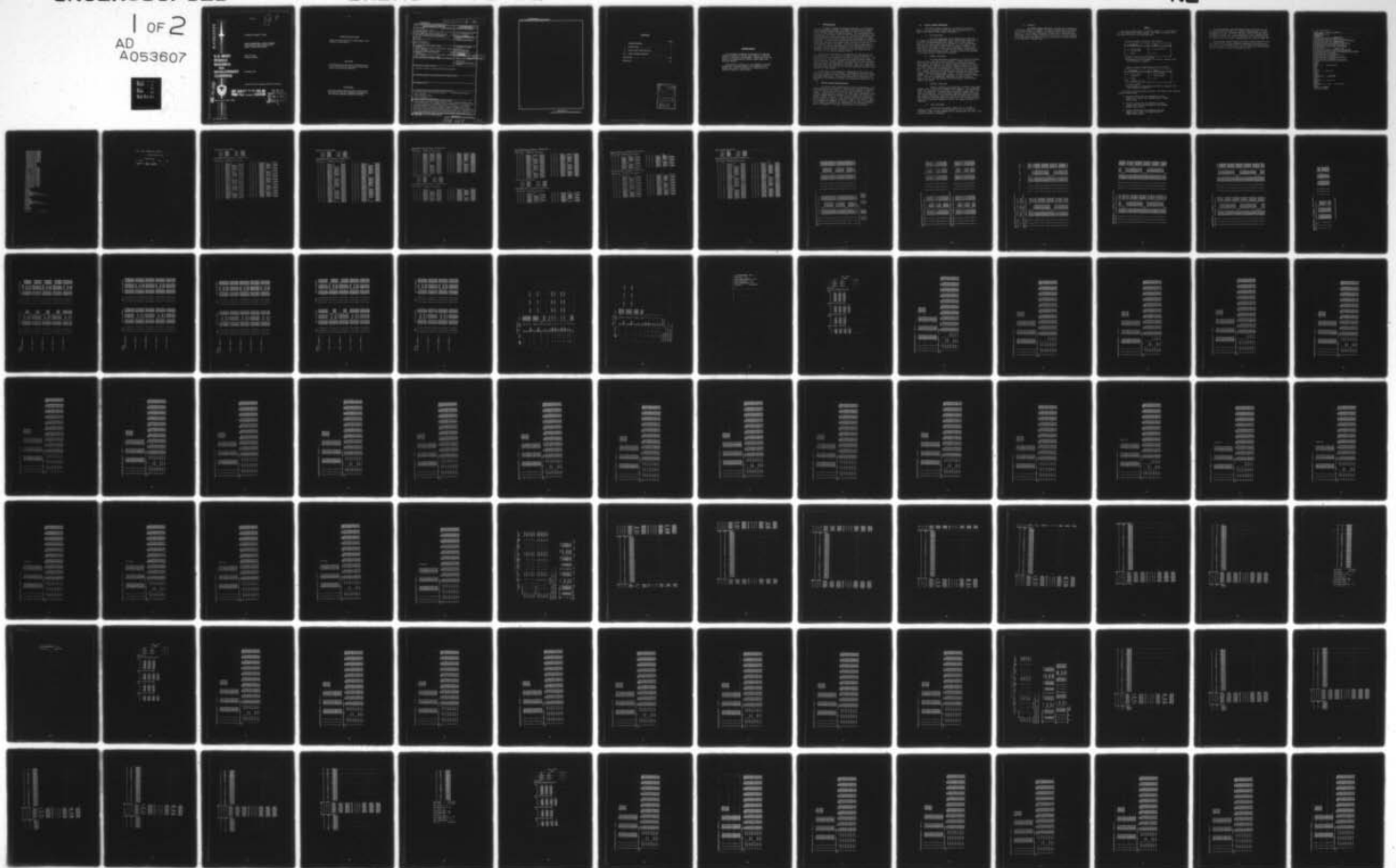AD-A053 607

ARMY MISSILE RESEARCH AND DEVELOPMENT COMMAND REDSTO--ETC F/G 21/9.2
THREE-DIMENSIONAL FINITE ELEMENT ANALYSIS OF A SOLID PROPELLANT--ETC(U)
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TECHNICAL REPORT T-78-18

THREE-DIMENSIONAL FINITE ELEMENT
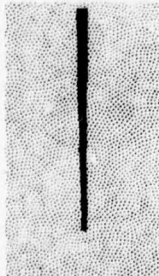ANALYSIS OF A SOLID PROPELLANT
GRAIN TRANSITION REGION

**U.S. ARMY
MISSILE
RESEARCH
AND
DEVELOPMENT
COMMAND**

Robert M. Hackett
Propulsion Directorate

November 1977

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Solid Propellant
Grain Transition Region
Thermal Stresses
Finite Element Mesh Generation

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A three-dimensional finite element analysis of the transition region, from a star cross-section to a cylindrical bore cross-section, for a typical solid propellant rocket motor grain configuration is carried out. The recently developed TEXGAP-3D (Texas Grain Analysis Program, 3-Dimensional) static linear elastic stress analysis computer program is employed in the analysis. Two loading conditions, combustion pressure and thermal, are considered, along with corresponding transition interface displacements obtained from previous two-dimensional finite element analyses of the uniform grain regions.

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CONTENTS

1

ACKNOWLEDGMENT

I. INTRODUCTION

In order to extend the analysis capability of the MIRADCOM Propulsion Mechanics Function, the TEXGAP-3D static linear elastic finite element computer code was obtained in July 1977 to be placed on the CDC 6600 computer at Redstone Arsenal. The development of the code evolved from a pilot effort in 1973, funded by Thiokol/Huntsville Division and more recently (the past two and a half years) has been sponsored by the US Air Force Rocket Propulsion Laboratory at Edwards, California. A short course on the TEXGAP-3D code, sponsored by Pacifica Technology, was held in Los Angeles the latter part of June 1977 at which time the code was released. Previous successful employment of the TEXGAP-2D computer code (developed by the same research group) by personnel of the Propulsion Mechanics Function primarily led to the decision to expend the effort necessary to get the TEXGAP-3D code operational on the Redstone computer system.

Once the code was adapted to the Redstone CDC 6600 computer and made operational, a task requiring a number of minor modifications to the obtained version of the code, a check-out procedure was begun. The check-out of the code involved running six classical check problems and two additional example problems and comparing the results obtained (computer output) with the results of computer runs (of the same problems) provided by the developers of TEXGAP-3D. Once these comparisons were made it was concluded that the code was operating correctly on the Redstone CDC 6600 computer.

At this point, the utilization of TEXGAP-3D for the purpose for which it was acquired was undertaken. The TEXGAP-3D analysis to which this report pertains is that of a transition region in a typical solid propellant rocket motor. The specific details of the analysis and a discussion of the results are given in the subsequent sections of this report.

II. ROCKET GRAIN CONFIGURATION

The rocket grain configuration is taken from Reference 1 and reproduced, in part, in Figure 1. Since only the transition region is to be considered, only that portion of the total geometry is shown in Figure 1. The transition is from a four-point star cross-section to a circular cylindrical bore cross-section. The region considered actually extends somewhat beyond (a distance of 0.463 inches) the transition region, as shown in Figure 1. Two slightly different star geometries are considered, as shown on Section A2 in Figure 1 and labeled I and II. Due to geometrical symmetry, as noted in Figure 1, and to the symmetry of the loading conditions to be considered, it was only necessary to model a 45° segment of the grain cross-section in the analysis.

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III.   FINITE ELEMENT MODELING

The finite element modeling of the transition region of Figure 1 will be discussed in detail and specific reference will be made to the TEXGAP-3D user's manual (Reference 2).

A.   Grid Generation

The three-dimensional finite element grid system for the transition region was generated using a BLOCK command (Reference 2) to create a three-dimensional block region, such as that shown in Figure 2, the edges of which may be defined by a cubic interpolation. This permits a high degree of definition of curved boundaries. The eight corner points must be input, as per Reference 2, while points 9 through 32 (see Figure 2) not specified are located automatically by linear interpolation between corners. As many blocks as are necessary to accurately define a region may be generated.

B.   Element Generation

The three-dimensional isoparametric 20 node brick element shown in Figure 3 was used in this analysis. As many bricks as are desired may be generated to fill the previously developed block(s). These elements are generated by a BRICK or BRICKH command (Reference 2). The BRICKH command employs a reformulated element (Reference 3) which takes into account near incompressibility (Poisson's ratio approaching 0.5). In this analysis the propellent grain elements were generated with a BRICKH command and the case elements were generated with a BRICK command. For both analysis models I and II, initially 16 propellant elements and 8 case elements were generated, as can be noted in Figures 4 and 5. The result of subsequent "rezoning" can also be noted in Figures 4 and 5, and this subject will be discussed a little further along in the report.

C.   Boundary Conditions

Boundary conditions may be applied to element faces and/or element nodes. This is done through various commands, such as PRESSURE, SLOPE, etc. (Reference 2), along with a face number or node number (see Figure 3) designation. Various boundary condition commands were utilized in this analysis, and of particular importance were those displacement boundary conditions, taken from previous two-dimensional analyses (see Figure 6), which were applied at each end of the transition region. These will be mentioned relative to each of the separate analyses to be presented.

D.   Post Processing

Various post processing commands may be utilized to compute stresses, strains and displacements at different points in an element. Some of these commands will be demonstrated when each of the separate analyses is presented.

E.   Rezoning

The REZONE command (Reference 2) allows one to subdivide a coarse grid region of elements, for which a solution has been obtained, into a region of smaller elements, and thereby obtain a more accurate solution.   A REPOS command (Reference 2) allows one to reposition nodal points when a better geometry definition is desired in a rezone analysis. The REZONE command was employed in this alalysis and the rezoned regions can be observed in Figures 4 and 5.

MODEL I

The finite element model I is shown in Figure 4. It was analyzed for both pressure and thermal loading. The TEXGAP-3D computer input and output is shown on the following pages.

Pressure Loading - Firing at -53°C (-65°F)

Propellant	Case
E_p = 1.31 x 10^7Pa (19,000 psi) ν_p = 0.499	E_c = 2.07 x 10^{10}Pa ν_c = 0.3

pressure = 1425 psi (9.83 x 10^5Pa)
Corresponding end displacements are shown on computer input and referenced to Figure 6.

Thermal Loading (2 Weeks Storage at -53°C (-65°F))

Propellant	Case
E_p = 4.82 x 10^5Pa (700 psi) ν_p = 0.499 α_p = 0.00089 in/in/$^{\circ}$F	E_c = 2.07 x 10^{10}Pa (3 x 10 psi) ν_c = 0.3

T_o = 60°C (140°F)
Corresponding end displacements are shown on computer input and referenced to Figure 6.

The results of three analyses on Model I are shown on the following computer output sheets:

1) pressure loading with two sequential rezoning computations, without any repositioning of element nodal points;

2) pressure loading with two sequential rezoning computations, with repositioning of some boundary element nodal points;

3) thermal loading with two sequential rezoning computations, without any repositioning of element nodal points.

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The first analysis, with rezoning near the cylindrical bore end of the transition (see Figure 4), yielded a maximum strain of 0.0231 in element 113 (IJK). The second analysis, with rezoning and repositioning near the star end of the transition, yielded a maximum strain of 0.0594 in element 339. The third analysis, with rezoning near the cylindrical bore end, yielded a maximum strain of 0.200 in element 333.

The following results consist of the full computer output for the first analysis (for element orientation purposes, in the interest of the reader), and abbreviated output for the second and third analyses. The first analysis is contained on pages 8 thru 94, the second on pages 95 thru 102, and the third on pages 103 thru 108.

```
LINE    DIRECT LIST OF INPUT DATA

  1 $FINOCYL - STAR TO CYLINDRICAL BORE TRANSITION (I)
  2 SETUP,4,PRESCRIB
  3 ISO,PROPELLANT,1,1.9E4,.499
  4 ISO,CASE,2,3.E7,.3
  5 END,MATERIALS
  6 BLOCK-C,I, 1,1,1, 5,5,3, 7,,5      $ PROPELLANT NODES
  7 .94,0,0, 2.447,0,0, 1.730,1.730,0, .665,.665,0/
  8 .94,0,.463, 2.447,0,.463, 1.730,1.730,.463, .665,.665,.453
  9 10,2.430,.651,0, 12,.814,.470,0, 18,2.430,.651,.463, 20,.814,.470,.463/
 10 22,2.180,1.258,0, 24,.908,.243,0, 30,2.180,1.258,.463, 32,.908,.243,.463
 11 BLOCK-C,1, 1,1,3, 5,5,7,  7,,5      $ PROPELLANT NODES
 12 .94,0,.463, 2.447,0,.463, 1.730,1.730,.463, .665,.665,.463/
 13 2.145,0,.463, 2.447,0,1.942, 1.730,1.730,1.942, .665,.665,1.942
 14 10,2.430,.651,.463, 12,.814,.470,.463, 13,1.31,0,.973/
 15 18,2.430,.651,1.942, 20,1.15,.33,1.942, 22,2.180,1.258,.463/
 16 24,.907,.243,.463, 25,1.775,0,1.432, 30,2.180,1.258,1.942/
 17 32,1.75,.33,1.942
 18 BLOCK-C,1, 1,1,7, 5,5,9, 7,,5      $ PROPELLANT NODES
 19 2.145,0,1.942, 2.447,0,1.942, 1.730,1.730,1.942, .665,.665,1.942/
 20 2.145,0,2.405, 2.447,0,2.405, 1.730,1.730,2.405, .665,.665,2.405
 21 10,2.430,.651,1.942, 12,1.15,.33,1.942, 18,2.430,.651,2.405, 20,1.15,.33,2.405/
 22 22,2.180,1.258,1.942, 24,1.75,.33,1.942, 30,2.18,1.258,2.405, 32,1.75,.33,2.405
 23 BLOCK,2, 5,1,1, 7,5,3      $ CASE NODES
 24 2.447,0,0,2.517,0,0,2.917,45,0,2.447,45,0/
 25 2.447,0,.463,2.517,0,.463,2.517,45,.463,2.447,45,.463
 26 BLOCK,2, 5,1,3, 7,5,7      $ CASE NODES
 27 2.447,0,.463,2.517,0,.463,2.517,45,.463,2.447,45,.463/
 28 2.447,0,1.942,2.517,0,1.942,2.517,45,1.942,2.447,45,1.942
 29 BLOCK,2, 5,1,7, 7,5,9      $ CASE NODES
 30 2.447,0,1.942,2.517,0,1.942,2.517,45,1.942,2.447,45,1.942/
 31 2.447,0,2.405,2.517,0,2.405,2.517,45,2.405,2.447,45,2.405
 32 END,GRID
 33 KLOOP,4
 34 ILOOP,2
 35 JLOOP,2
 36 BPICKM,1, 1,1,1      $ PROPELLANT ELEMENTS
 37 JEND
 38 IEND
 39 KEND
 40 KLOOP,4
 41 JLOOP,2
 42 BRICK,2, 5,1,1      $ CASE ELEMENTS
 43 JEND
 44 KEND
 45 KLOOP,4
 46 ILOOP,3
 47 BC,SLOPE,1,1,1, 5      $ C DEGREE FACE
 48 BC,SLOPE,1,3,1, 2      $ 45 DEGREE FACE
 49 IEND
 50 KEND
 51 JLOOP,2
 52 BC,SLOPE,5,1,1, 6      $ END OF CASE
 53 JEND
 94 KLOOP,4
 55 JLOOP,2
 56 BC,PRESSURE, 1,1,1, 4,1.425E3      $ 1425 PSI PRESSURE
 57 JEND
 58 KEND
 59 BC,UZ,1,1,1, 0,-2.184E-2
 60 BC,UZ,1,2,1, 0,-2.184E-2
 61 BC,UZ,1,3,1, 0,-2.184E-2
```

8

```
62  BC,UZ,1,5,1,  0,-1.636E-2
63  BC,UZ,1,5,1,  0,-2.184E-2
64  BC,UZ,2,1,1,  0,-1.636E-2
65  BC,UZ,2,3,1,  0,-1.636E-2
66  BC,UZ,2,5,1,  0,-1.636E-2
67  BC,UZ,3,1,1,  0,-1.092E-2
68  BC,UZ,3,2,1,  0,-1.092E-2
69  BC,UZ,3,3,1,  0,-1.092E-2
70  BC,UZ,3,4,1,  0,-1.092E-2
71  BC,UZ,3,5,1,  0,-1.092E-2
72  BC,UZ,4,1,1,  0,-0.546E-2
73  BC,UZ,4,3,1,  0,-0.546E-2
74  BC,UZ,4,5,1,  0,-0.546E-2
75  BC,UZ,5,1,1,  0,0.
76  BC,UZ,5,2,1,  0,0.
77  BC,UZ,5,3,1,  0,0.
78  BC,UZ,5,4,1,  0,0.
79  BC,UZ,5,5,1,  0,0.
80  BC,UZ,1,1,9,  0,-.215E-2
81  BC,UZ,1,2,9,  0,-.268E-2
82  BC,UZ,1,3,9,  0,-.347E-2
83  BC,UZ,1,4,9,  0,-.435E-2
84  BC,UZ,1,5,9,  0,-.462E-2
85  BC,UZ,2,1,9,  0,-.200E-2
86  BC,UZ,2,3,9,  0,-.296E-2
87  BC,UZ,2,5,9,  0,-.364E-2
88  BC,UZ,3,1,9,  0,-.184E-2
89  BC,UZ,3,2,9,  0,-.206E-2
90  BC,UZ,3,3,9,  0,-.257E-2
91  BC,UZ,3,4,9,  0,-.317E-2
92  BC,UZ,3,5,9,  0,-.341E-2
93  BC,UZ,4,1,9,  0,-.168E-2
94  BC,UZ,4,3,9,  0,-.199E-2
95  BC,UZ,4,5,9,  0,-.230E-2
96  BC,UZ,5,1,9,  0,-.153E-2
97  BC,UZ,5,2,9,  0,-.153E-2
98  BC,UZ,5,3,9,  0,-.153E-2
99  BC,UZ,5,4,9,  0,-.153E-2
100 BC,UZ,5,5,9,  0,-.153E-2
101 END,ELEMENTS
102 SOLVE
103 POST
104 BLOCK
105 OPTION,2
106 END,POST
107 REZONE,1,1,3,  3,3,5
108 REFINE,GRADS,1,1,3,  2,2,2
109 BCR,REZONE,1,1,3,  2,2,2,2,2,2,  1,1,3
110 END,CONTROL
111 SOLVE
112 POST
113 BLOCK
114 OPTION,2
115 END,POST
116 REZONE,1,1,3,  3,3,5
117 REFINE,GRADS,1,1,3,  2,2,2
118 BCR,REZONE,1,1,3,  2,2,2,2,2,2,  1,1,3
119 END,CONTROL
120 SOLVE
121 POST
122 BLOCK
123 OPTION,2
124 END,POST
125 STOP

TIME IN FFLOSB    =      .872 SECONDS
```

FINOCYL - STAR TO CYLINDRICAL BORE TRANSITION (I)

MATERIAL PROPERTIES BY TYPES

ISOTROPIC MATERIALS

NO	MATERIAL	E	NU	ALPHA	RHO
1	PROPELLANT	.190E+05	.499E+00	0.	0.
2	CASE	.300E+08	.300E+00	0.	0.

GRADIENTS FOR NEXT BLOCK GENERATION

```
        G( 1) =  .100E+01          G( 2) =  .100E+01
        G( 3) =  .100E+01          G( 4) =  .100E+01
        G( 5) =  .100E+01          G( 6) =  .100E+01
        G( 7) =  .900E+00          G( 8) =  .100E+01
        G( 9) =  .100E+01          G(10) =  .100E+01
        G(11) =  .100E+01          G(12) =  .100E+01
```

MESH GENERATION BLOCK-C IN CARTESIAN COORDINATE SYSTEM 1
FROM I J K 1 1 1 TO I J K 5 5 3

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

I	J	K	X	Y	Z	I	J	K	X	Y	Z
1	1	1	.9400E+00	0.	0.	1	1	2	.9400E+00	0.	.2315E+00
1	1	3	.9400E+00	0.	.4630E+00	1	2	1	.9221E+00	.1631E+00	0.
1	2	2	.9221E+00	.1931E+00	.2315E+00	1	2	3	.9221E+00	.1831E+00	.4630E+00
1	3	1	.8683E+00	.3595E+00	0.	1	3	2	.8683E+00	.3595E+00	.2315E+00
1	3	3	.8683E+00	.3595E+00	.4630E+00	1	4	1	.7816E+00	.5224E+00	0.
1	4	2	.7816E+00	.5224E+00	.2315E+00	1	4	3	.7816E+00	.5224E+00	.4630E+00
1	5	1	.6650E+00	.6650E+00	0.	1	5	2	.6650E+00	.6650E+00	.2315E+00
1	5	3	.6650E+00	.6650E+00	.4630E+00	2	1	1	.1317E+01	0.	0.
2	1	2	.1317E+01	0.	.2315E+00	2	1	3	.1317E+01	0.	.4630E+00
2	2	1	.1306E+01	.2595E+00	0.	2	2	2	.1293E+01	.2569E+00	.2315E+00
2	2	3	.1276E+01	.2535E+00	.4630E+00	2	3	1	.1234E+01	.5110E+00	0.
2	3	2	.1209E+01	.5035E+00	.2315E+00	2	3	3	.1176E+01	.4871E+00	.4630E+00
2	4	1	.1107E+01	.7398E+00	0.	2	4	2	.1074E+01	.7172E+00	.2315E+00
2	4	3	.1030E+01	.6983E+00	.4630E+00	2	5	1	.9312E+00	.9312E+00	0.
2	5	2	.8943E+00	.8943E+00	.2315E+00	2	5	3	.8471E+00	.9471E+00	.4630E+00
3	1	1	.1694E+01	0.	0.	3	1	2	.1694E+01	0.	.2315E+00
3	1	3	.1694E+01	0.	.4630E+00	3	2	1	.1690E+01	.3360E+00	0.
3	2	2	.1671E+01	.3323E+00	.2315E+00	3	2	3	.1646E+01	.3273E+00	.4630E+00
3	3	1	.1600E+01	.6626E+00	0.	3	3	2	.1565E+01	.6481E+00	.2315E+00
3	3	3	.1517E+01	.6282E+00	.4630E+00	3	4	1	.1433E+01	.9573E+00	0.
3	4	2	.1367E+01	.9261E+00	.2315E+00	3	4	3	.1322E+01	.8832E+00	.4630E+00
3	5	1	.1198E+01	.1198E+01	0.	3	5	2	.1147E+01	.1147E+01	.2315E+00
3	5	3	.1077E+01	.1077E+01	.4630E+00	4	1	1	.2070E+01	0.	0.
4	1	2	.2070E+01	0.	.2315E+00	4	1	3	.2070E+01	0.	.4630E+00
4	2	1	.2074E+01	.4124E+00	0.	4	2	2	.2059E+01	.4096E+00	.2315E+00
4	2	3	.2038E+01	.4054E+00	.4630E+00	4	3	1	.1966E+01	.8141E+00	0.
4	3	2	.1939E+01	.8329E+00	.2315E+00	4	3	3	.1899E+01	.7862E+00	.4630E+00
4	4	1	.1759E+01	.1175E+01	0.	4	4	2	.1723E+01	.1151E+01	.2315E+00
4	4	3	.1669E+01	.1115E+01	.4630E+00	4	5	1	.1464E+01	.1464E+01	0.
4	5	2	.1424E+01	.1424E+01	.2315E+00	4	5	3	.1366E+01	.1366E+01	.4630E+00
5	1	1	.2447E+01	0.	0.	5	1	2	.2447E+01	0.	.2315E+00
5	1	3	.2447E+01	0.	.4630E+00	5	2	1	.2457E+01	.4888E+00	0.
5	2	2	.2457E+01	.4988E+00	.2315E+00	5	2	3	.2457E+01	.4888E+00	.4630E+00
5	3	1	.2332E+01	.9657E+00	0.	5	3	2	.2332E+01	.9657E+00	.2315E+00
5	3	3	.2332E+01	.9657E+00	.4630E+00	5	4	1	.2085E+01	.1392E+01	0.
5	4	2	.2085E+01	.1392E+01	.2315E+00	5	4	3	.2085E+01	.1392E+01	.4630E+00
5	5	1	.1730E+01	.1730E+01	0.	5	5	2	.1730E+01	.1730E+01	.2315E+00
5	5	3	.1730E+01	.1730E+01	.4630E+00						

GRADIENTS FOR NEXT BLOCK GENERATION

```
        G( 1) =   .100E+01        G( 2) =   .100E+01
        G( 3) =   .100E+01        G( 4) =   .100E+01
        G( 5) =   .100E+01        G( 6) =   .100E+01
        G( 7) =   .500E+00        G( 8) =   .100E+01
        G( 9) =   .100E+01        G(10) =   .100E+01
        G(11) =   .100E+01        G(12) =   .100E+01
```

MESH GENERATION BLOCK-C IN CARTESIAN   COORDINATE SYSTEM 1
FRCM I J K   1 1 3 TO I J K   5   5   7

GLOBAL CARTESIAN   CCOROINATES CF POINTS GENERATED

I	J	K	X	Y	Z	I	J	K	X	Y	Z
1	1	3	.9400E+00	0.	.4630E+00	1	1	4	.1201E+01	0.	.8543E+00
1	1	5	.1543E+01	0.	.1203E+01	1	1	6	.1844E+01	0.	.1551E+01
1	1	7	.2145E+01	0.	.1942E+01	1	2	3	.9210E+00	.1831E+00	.4630E+00
1	2	4	.1131E+01	.2134E+00	.8489E+00	1	2	5	.1401E+01	.2430E+00	.1203E+01
1	2	6	.1671E+01	.2741E+00	.1556E+01	1	2	7	.1800E+01	.3844E+00	.1942E+01
1	3	3	.8677E+00	.3595E+00	.4630E+00	1	3	4	.9947E+00	.3520E+00	.8435E+00
1	3	5	.1162E+01	.3446E+00	.1203E+01	1	3	6	.1329E+01	.3371E+00	.1561E+01
1	3	7	.1456E+01	.3297E+00	.1942E+01	1	4	3	.7818E+00	.5224E+00	.4630E+00
1	4	4	.8277E+00	.4809E+00	.8381E+00	1	4	9	.8937E+00	.4394E+00	.1203E+01
1	4	6	.9596E+00	.3979E+00	.1567E+01	1	4	7	.1005E+01	.3564E+00	.1942E+01
1	5	3	.6650E+00	.6650E+00	.4630E+00	1	5	4	.6650E+00	.6650E+00	.8328E+00
1	5	5	.6650E+00	.6550E+00	.1203E+01	1	5	6	.6650E+00	.6650E+00	.1572E+01
1	5	7	.6650E+00	.6550E+00	.1942E+01	2	1	3	.1317E+01	0.	.4630E+00
2	1	4	.1513E+01	0.	.8489E+00	2	1	5	.1769E+01	0.	.1203E+01
2	1	6	.2029E+01	0.	.1556E+01	2	1	7	.2221E+01	0.	.1942E+01
2	2	3	.1305E+01	.2595E+00	.4630E+00	2	2	4	.1457E+01	.2512E+00	.8449E+00
2	2	5	.1656E+01	.3029E+00	.1203E+01	2	2	6	.1856E+01	.3240E+00	.1560E+01
2	2	7	.2013E+01	.3469E+00	.1942E+01	2	3	3	.1234E+01	.5110E+00	.4630E+00
2	3	4	.1316E+01	.5304E+00	.8409E+00	2	3	5	.1434E+01	.4891E+00	.1203E+01
2	3	6	.1552E+01	.4765E+00	.1564E+01	2	3	7	.1648E+01	.4636E+00	.1942E+01
2	4	3	.1108E+01	.7398E+00	.4630E+00	2	4	4	.1127E+01	.6975E+00	.8309E+00
2	4	5	.1160E+01	.6528E+00	.1203E+01	2	4	6	.1194E+01	.6052E+00	.1560E+01
2	4	7	.1211E+01	.5540E+00	.1942E+01	2	5	3	.9312E+00	.9312E+00	.4630E+00
2	5	4	.9137E+00	.9137E+00	.8327E+00	2	5	5	.8943E+00	.8943E+00	.1203E+01
2	5	6	.8723E+00	.8723E+00	.1572E+01	2	5	7	.8471E+00	.8471E+00	.1942E+01
3	1	3	.1694E+01	0.	.4630E+00	3	1	4	.1824E+01	0.	.8435E+00
3	1	5	.1995E+01	0.	.1203E+01	3	1	6	.2189E+01	0.	.1901E+01
3	1	7	.2296E+01	0.	.1942E+01	3	2	3	.1689E+01	.3360E+00	.4630E+00
3	2	4	.1787E+01	.3496E+00	.8409E+00	3	2	5	.1916E+01	.3634E+00	.1203E+01
3	2	6	.2049E+01	.3773E+00	.1564E+01	3	2	7	.2153E+01	.3914E+00	.1942E+01
3	3	3	.1600E+01	.6626E+00	.4630E+00	3	3	4	.1648E+01	.6520E+00	.8382E+00
3	3	5	.1719E+01	.6403E+00	.1203E+01	3	3	6	.1791E+01	.6270E+00	.1566E+01
3	3	7	.1844E+01	.6116E+00	.1942E+01	3	4	3	.1433E+01	.9573E+00	.4630E+00
3	4	4	.1435E+01	.9213E+00	.8355E+00	3	4	5	.1447E+01	.8816E+00	.1203E+01
3	4	6	.1457E+01	.8371E+00	.1569E+01	3	4	7	.1453E+01	.7861E+00	.1942E+01
3	5	3	.1198E+01	.1198E+01	.4630E+00	3	5	4	.1174E+01	.1174E+01	.8327E+00
3	5	5	.1147E+01	.1147E+01	.1203E+01	3	5	6	.1115E+01	.1115E+01	.1572E+01
3	5	7	.1077E+01	.1077E+01	.1942E+01	4	1	3	.2070E+01	0.	.4630E+00
4	1	4	.2136E+01	0.	.8381E+00	4	1	5	.2221E+01	0.	.1203E+01
4	1	6	.2306E+01	0.	.1567E+01	4	1	7	.2372E+01	0.	.1942E+01
4	2	3	.2073E+01	.4124E+00	.4630E+00	4	2	4	.2120E+01	.4188E+00	.8369E+00
```

MESH GENERATION BLOCK-C IN CARTESIAN COORDINATE SYSTEM 1
FROM I J K 1 1 3 TO I J K 5 5 7

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

| I | J | K | X | Y | Z | I | J | K | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 2 | 5 | .2183E+01 | .4243E+00 | .1203E+01 | 4 | 2 | 5 | .2249E+01 | .4318E+00 | .1568E+01 |
| 4 | 2 | 7 | .2300E+01 | .4385E+00 | .1942E+01 | 4 | 3 | 3 | .1966E+01 | .8141E+00 | .6639E+00 |
| 4 | 3 | 4 | .1986E+01 | .8371E+00 | .8355E+00 | 4 | 3 | 5 | .2018E+01 | .7989E+00 | .1203E+01 |
| 4 | 3 | 6 | .2050E+01 | .7692E+00 | .1569E+01 | 4 | 3 | 7 | .2073E+01 | .7774E+00 | .1942E+01 |
| 4 | 4 | 3 | .1759E+01 | .1175E+01 | .4630E+00 | 4 | 4 | 4 | .1755E+01 | .1153E+01 | .8342E+00 |
| 4 | 4 | 5 | .1794E+01 | .1129E+01 | .1203E+01 | 4 | 4 | 6 | .1792E+01 | .1090E+01 | .1571E+01 |
| 4 | 4 | 7 | .1741E+01 | .1062E+01 | .1942E+01 | 4 | 5 | 3 | .1464E+01 | .1464E+01 | .4630E+00 |
| 4 | 5 | 4 | .1446E+01 | .1446E+01 | .8327E+00 | 4 | 5 | 5 | .1424E+01 | .1424E+01 | .1203E+01 |
| 4 | 5 | 6 | .1398E+01 | .1398E+01 | .1572E+01 | 4 | 5 | 7 | .1366E+01 | .1366E+01 | .1942E+01 |
| 5 | 1 | 3 | .2447E+01 | 0. | .4630E+00 | 5 | 1 | 4 | .2447E+01 | 0. | .8328E+00 |
| 5 | 1 | 5 | .2447E+01 | 0. | .1203E+01 | 5 | 1 | 6 | .2447E+01 | 0. | .1572E+01 |
| 5 | 1 | 7 | .2447E+01 | 0. | .1942E+01 | 5 | 2 | 3 | .2457E+01 | .4888E+00 | .4630E+00 |
| 5 | 2 | 4 | .2457E+01 | .4888E+00 | .8327E+00 | 5 | 2 | 5 | .2457E+01 | .4888E+00 | .1203E+01 |
| 5 | 2 | 6 | .2457E+01 | .4888E+00 | .1572E+01 | 5 | 2 | 7 | .2457E+01 | .4888E+00 | .1942E+01 |
| 5 | 3 | 3 | .2332E+01 | .9657E+00 | .4630E+00 | 5 | 3 | 4 | .2332E+01 | .9657E+00 | .8328E+00 |
| 5 | 3 | 5 | .2332E+01 | .9657E+00 | .1203E+01 | 5 | 3 | 6 | .2332E+01 | .9657E+00 | .1572E+01 |
| 5 | 3 | 7 | .2332E+01 | .9657E+00 | .1942E+01 | 5 | 4 | 3 | .2085E+01 | .1392E+01 | .4630E+00 |
| 5 | 4 | 4 | .2085E+01 | .1392E+01 | .8328E+00 | 5 | 4 | 5 | .2085E+01 | .1392E+01 | .1203E+01 |
| 5 | 4 | 6 | .2085E+01 | .1392E+01 | .1572E+01 | 5 | 4 | 7 | .2085E+01 | .1392E+01 | .1942E+01 |
| 5 | 5 | 3 | .1730E+01 | .1730E+01 | .4630E+00 | 5 | 5 | 4 | .1730E+01 | .1730E+01 | .8328E+00 |
| 5 | 5 | 5 | .1730E+01 | .1730E+01 | .1203E+01 | 5 | 5 | 6 | .1730E+01 | .1730E+01 | .1572E+01 |
| 5 | 5 | 7 | .1730E+01 | .1730E+01 | .1942E+01 | | | | | | |

GRADIENTS FOR NEXT BLOCK GENERATION

| | | | | | |
|---|---|---|---|---|---|
| G( 1) = | .100E+01 | | G( 2) = | .100E+01 | |
| G( 3) = | .100E+01 | | G( 4) = | .100E+01 | |
| G( 5) = | .100E+01 | | G( 6) = | .100E+01 | |
| G( 7) = | .500E+00 | | G( 8) = | .100E+01 | |
| G( 9) = | .100E+01 | | G(10) = | .100E+01 | |
| G(11) = | .100E+01 | | G(12) = | .100E+01 | |

MESH GENERATION BLOCK-C IN CARTESIAN COORDINATE SYSTEM 1
FROM I J K 1 1 7 TO I J K 5 5 9

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

| I | J | K | X | Y | Z | I | J | K | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 7 | .2145E+01 | 0. | .1942E+01 | 1 | 1 | 8 | .2145E+01 | 0. | .2174E+01 |
| 1 | 1 | 9 | .2145E+01 | 0. | .2405E+01 | 1 | 2 | 7 | .1880E+01 | .3044E+00 | .1942E+01 |
| 1 | 2 | 8 | .1880E+01 | .3044E+00 | .2174E+01 | 1 | 2 | 9 | .1880E+01 | .3044E+00 | .2405E+01 |
| 1 | 3 | 7 | .1456E+01 | .3897E+00 | .1942E+01 | 1 | 3 | 8 | .1456E+01 | .3297E+00 | .2174E+01 |
| 1 | 3 | 9 | .1456E+01 | .3297E+00 | .2405E+01 | 1 | 4 | 7 | .1005E+01 | .3566E+00 | .1942E+01 |
| 1 | 4 | 8 | .1005E+01 | .3564E+00 | .2174E+01 | 1 | 4 | 9 | .1005E+01 | .3564E+00 | .2405E+01 |
| 1 | 5 | 7 | .6650E+00 | .6650E+00 | .1942E+01 | 1 | 5 | 8 | .6650E+00 | .6650E+00 | .2174E+01 |
| 1 | 5 | 9 | .6650E+00 | .6650E+00 | .2405E+01 | 2 | 1 | 7 | .2221E+01 | 0. | .1942E+01 |
| 2 | 1 | 8 | .2221E+01 | 0. | .2174E+01 | 2 | 1 | 9 | .2221E+01 | 0. | .2405E+01 |
| 2 | 2 | 7 | .2025E+01 | .3505E+00 | .1942E+01 | 2 | 2 | 8 | .2020E+01 | .3489E+00 | .2174E+01 |
| 2 | 2 | 9 | .2013E+01 | .3469E+00 | .2405E+01 | 2 | 3 | 7 | .1675E+01 | .4887E+00 | .1942E+01 |
| 2 | 3 | 8 | .1660E+01 | .4776E+00 | .2174E+01 | 2 | 3 | 9 | .1640E+01 | .4636E+00 | .2405E+01 |
| 2 | 4 | 7 | .1275E+01 | .6153E+00 | .1942E+01 | 2 | 4 | 8 | .1247E+01 | .5883E+00 | .2174E+01 |

MESH GENERATION BLOCK-C IN CARTESIAN COORDINATE SYSTEM 1
FRCM I J K 1 1 7 TO I J K 5 5 9

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

| I | J | K | X | Y | Z | I | J | K | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 9 | .1211E+01 | .5540E+00 | .2405E+01 | 2 | 5 | 7 | .9312E+00 | .9312E+00 | .1942E+01 |
| 2 | 5 | 8 | .8943E+00 | .8943E+00 | .2174E+01 | 2 | 5 | 9 | .8471E+00 | .8471E+00 | .2405E+01 |
| 3 | 1 | 7 | .2296E+01 | 0. | .1942E+01 | 3 | 1 | 8 | .2296E+01 | 0. | .2174E+01 |
| 3 | 1 | 9 | .2296E+01 | 0. | .2405E+01 | 3 | 2 | 7 | .2169E+01 | .5966E+00 | .1942E+01 |
| 3 | 2 | 8 | .2162E+01 | .3944E+00 | .2174E+01 | 3 | 2 | 9 | .2153E+01 | .3914E+00 | .2405E+01 |
| 3 | 3 | 7 | .1894E+01 | .6477E+00 | .1942E+01 | 3 | 3 | 8 | .1873E+01 | .6325E+00 | .2174E+01 |
| 3 | 3 | 9 | .1844E+01 | .6116E+00 | .2405E+01 | 3 | 4 | 7 | .1545E+01 | .8743E+00 | .1942E+01 |
| 3 | 4 | 8 | .1507E+01 | .8372E+00 | .2174E+01 | 3 | 4 | 9 | .1453E+01 | .7861E+00 | .2405E+01 |
| 3 | 5 | 7 | .1198E+01 | .1198E+01 | .1942E+01 | 3 | 5 | 8 | .1147E+01 | .1147E+01 | .2174E+01 |
| 3 | 5 | 9 | .1077E+01 | .1077E+01 | .2405E+01 | 4 | 1 | 7 | .2372E+01 | 0. | .1942E+01 |
| 4 | 1 | 8 | .2372E+01 | 0. | .2174E+01 | 4 | 1 | 9 | .2372E+01 | 0. | .2405E+01 |
| 4 | 2 | 7 | .2313E+01 | .4427E+00 | .1942E+01 | 4 | 2 | 8 | .2308E+01 | .4410E+00 | .2174E+01 |
| 4 | 2 | 9 | .2300E+01 | .4385E+00 | .2405E+01 | 4 | 3 | 7 | .2113E+01 | .6867E+00 | .1942E+01 |
| 4 | 3 | 8 | .2097E+01 | .7949E+00 | .2174E+01 | 4 | 3 | 9 | .2073E+01 | .7774E+00 | .2405E+01 |
| 4 | 4 | 7 | .1815E+01 | .1133E+01 | .1942E+01 | 4 | 4 | 8 | .1765E+01 | .1104E+01 | .2174E+01 |
| 4 | 4 | 9 | .1741E+01 | .1062E+01 | .2405E+01 | 4 | 5 | 7 | .1464E+01 | .1464E+01 | .1942E+01 |
| 4 | 5 | 8 | .1424E+01 | .1424E+01 | .2174E+01 | 4 | 5 | 9 | .1366E+01 | .1366E+01 | .2405E+01 |
| 5 | 1 | 7 | .2447E+01 | 0. | .1942E+01 | 5 | 1 | 8 | .2447E+01 | 0. | .2174E+01 |
| 5 | 1 | 9 | .2447E+01 | 0. | .2405E+01 | 5 | 2 | 7 | .2457E+01 | .4888E+00 | .1942E+01 |
| 5 | 2 | 8 | .2457E+01 | .4888E+00 | .2174E+01 | 5 | 2 | 9 | .2457E+01 | .4888E+00 | .2405E+01 |
| 5 | 3 | 7 | .2332E+01 | .9657E+00 | .1942E+01 | 5 | 3 | 8 | .2332E+01 | .9657E+00 | .2174E+01 |
| 5 | 3 | 9 | .2332E+01 | .9657E+00 | .2405E+01 | 5 | 4 | 7 | .2085E+01 | .1392E+01 | .1942E+01 |
| 5 | 4 | 8 | .2085E+01 | .1392E+01 | .2174E+01 | 5 | 4 | 9 | .2085E+01 | .1392E+01 | .2405E+01 |
| 5 | 5 | 7 | .1730E+01 | .1730E+01 | .1942E+01 | 5 | 5 | 8 | .1730E+01 | .1730E+01 | .2174E+01 |

GRADIENTS FOR NEXT BLOCK GENERATION

| | | | | |
|---|---|---|---|---|
| G( 1) = | .100E+01 | | G( 2) = | .100E+01 |
| G( 3) = | .100E+01 | | G( 4) = | .100E+01 |
| G( 5) = | .100E+01 | | G( 6) = | .100E+01 |
| G( 7) = | .100E+01 | | G( 8) = | .100E+01 |
| G( 9) = | .100E+01 | | G(10) = | .100E+01 |
| G(11) = | .100E+01 | | G(12) = | .100E+01 |

MESH GENERATION BLOCK IN CYLINDRICAL COORDINATE SYSTEM 2
FRCM I J K 5 1 1 TO I J K 7 5 3

GLOBAL CYLINDRICAL CCORDINATES OF POINTS GENERATED

| I | J | K | R | THETA | Z | I | J | K | R | THETA | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 1 | 1 | .2447E+01 | 0. | 0. | 5 | 1 | 2 | .2447E+01 | 0. | .2319E+00 |
| 5 | 1 | 3 | .2447E+01 | 0. | .4630E+00 | 5 | 2 | 1 | .2447E+01 | .1125E+02 | 0. |
| 5 | 2 | 2 | .2447E+01 | .1125E+02 | .2315E+00 | 5 | 2 | 3 | .2447E+01 | .1125E+02 | .4630E+00 |
| 5 | 3 | 1 | .2447E+01 | .2250E+02 | 0. | 5 | 3 | 2 | .2447E+01 | .2250E+02 | .2315E+00 |
| 5 | 3 | 3 | .2447E+01 | .2250E+02 | .4630E+00 | 5 | 4 | 1 | .2447E+01 | .3375E+02 | 0. |
| 5 | 4 | 2 | .2447E+01 | .3375E+02 | .2315E+00 | 5 | 4 | 3 | .2447E+01 | .3375E+02 | .4630E+00 |
| 5 | 5 | 1 | .2447E+01 | .4500E+02 | 0. | 5 | 5 | 2 | .2447E+01 | .4900E+02 | .2319E+00 |
| 5 | 5 | 3 | .2447E+01 | .4500E+02 | .4630E+00 | 6 | 1 | 1 | .2482E+01 | 0. | 0. |
| 6 | 1 | 2 | .2482E+01 | 0. | .2315E+00 | 6 | 1 | 3 | .2482E+01 | 0. | .4630E+00 |
| 6 | 2 | 1 | .2482E+01 | .1125E+02 | 0. | 6 | 2 | 2 | .2482E+01 | .1125E+02 | .2315E+00 |

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MESH GENERATION BLOCK IN CYLINDRICAL COORDINATE SYSTEM 2
FROM I J K 5 1 1 TO I J K 7 5 3

GLOBAL CYLINDRICAL CCORDINATES OF POINTS GENERATED

| I | J | K | R | THETA | Z | I | J | K | R | THETA | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 2 | 3 | .2482E+01 | .1125E+02 | .463CE+00 | 6 | 3 | 1 | .2482E+01 | .2250E+02 | 0. |
| 6 | 3 | 2 | .2482E+01 | .2250E+02 | .2315E+00 | 6 | 3 | 3 | .2482E+01 | .2250E+02 | .4630E+00 |
| 6 | 4 | 1 | .2482E+01 | .3875E+02 | 0. | 6 | 4 | 2 | .2482E+01 | .3375E+02 | .2315E+00 |
| 6 | 4 | 3 | .2482E+01 | .3875E+02 | .4630E+00 | 6 | 5 | 1 | .2482E+01 | .4500E+02 | 0. |
| 6 | 5 | 2 | .2482E+01 | .4500E+02 | .2315E+00 | 6 | 5 | 3 | .2482E+01 | .4500E+02 | .4630E+00 |
| 7 | 1 | 1 | .2917E+01 | 0. | 0. | 7 | 1 | 2 | .2517E+01 | 0. | .2315E+00 |
| 7 | 1 | 3 | .2517E+01 | C. | .4630E+00 | 7 | 2 | 1 | .2517E+01 | .1125E+02 | 0. |
| 7 | 2 | 2 | .2517E+01 | .1125E+02 | .2315E+00 | 7 | 2 | 3 | .2517E+01 | .1125E+02 | .4630E+00 |
| 7 | 3 | 1 | .2517E+01 | .2250E+02 | 0. | 7 | 3 | 2 | .2517E+01 | .2250E+02 | .2315E+00 |
| 7 | 3 | 3 | .2517E+01 | .2250E+02 | .4630E+00 | 7 | 4 | 1 | .2517E+01 | .3375E+02 | 0. |
| 7 | 4 | 2 | .2517E+01 | .3375E+02 | .2315E+00 | 7 | 4 | 3 | .2517E+01 | .3375E+02 | .4630E+00 |
| 7 | 5 | 1 | .2517E+01 | .4500E+02 | 0. | 7 | 5 | 2 | .2517E+01 | .4500E+02 | .2315E+00 |
| 7 | 5 | 3 | .2517E+01 | .4500E+02 | .463CE+00 | | | | | | |

MESH GENERATION BLOCK IN CYLINDRICAL COORDINATE SYSTEM 2
FROM I J K 5 1 1 TO I J K 7 5 3

GLOBAL CARTESIAN CCORDINATES OF POINTS GENERATED

| I | J | K | X | Y | Z | I | J | K | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 1 | 1 | .2447E+01 | C. | 0. | 5 | 1 | 2 | .2447E+01 | 0. | .2315E+00 |
| 5 | 1 | 3 | .2447E+01 | 0. | .4630E+00 | 5 | 2 | 1 | .2400E+01 | .4774E+00 | 0. |
| 5 | 2 | 2 | .2400E+01 | .4774E+00 | .2315E+00 | 5 | 2 | 3 | .2400E+01 | .4774E+00 | .4630E+00 |
| 5 | 3 | 1 | .2261E+01 | .9364E+00 | 0. | 5 | 3 | 2 | .2261E+01 | .9364E+00 | .2315E+00 |
| 5 | 3 | 3 | .2261E+01 | .9364E+00 | .4630E+00 | 5 | 4 | 1 | .2035E+01 | .1359E+01 | 0. |
| 5 | 4 | 2 | .2035E+01 | .1359E+01 | .2315E+00 | 5 | 4 | 3 | .2035E+01 | .1359E+01 | .4630E+00 |
| 5 | 5 | 1 | .1730E+01 | .1730E+01 | 0. | 5 | 5 | 2 | .1730E+01 | .1730E+01 | .2315E+00 |
| 5 | 5 | 3 | .1730E+01 | .1730E+01 | .4630E+00 | 6 | 1 | 1 | .2482E+01 | 0. | 0. |
| 6 | 1 | 2 | .2482E+01 | 0. | .2315E+00 | 6 | 1 | 3 | .2482E+01 | 0. | .4630E+00 |
| 6 | 2 | 1 | .2434E+01 | .4842E+00 | 0. | 6 | 2 | 2 | .2434E+01 | .4842E+00 | .2315E+00 |
| 6 | 2 | 3 | .2434E+01 | .4842E+00 | .4630E+00 | 6 | 3 | 1 | .2293E+01 | .9498E+00 | 0. |
| 6 | 3 | 2 | .2293E+01 | .9498E+00 | .2315E+00 | 6 | 3 | 3 | .2293E+01 | .9498E+00 | .4630E+00 |
| 6 | 4 | 1 | .2064E+01 | .1379E+01 | 0. | 6 | 4 | 2 | .2064E+01 | .1379E+01 | .2315E+00 |
| 6 | 4 | 3 | .2064E+01 | .1379E+01 | .4630E+00 | 6 | 5 | 1 | .1755E+01 | .1755E+01 | 0. |
| 6 | 5 | 2 | .1755E+01 | .1755E+01 | .2315E+00 | 6 | 5 | 3 | .1755E+01 | .1755E+01 | .4630E+00 |
| 7 | 1 | 1 | .2517E+01 | 0. | 0. | 7 | 1 | 2 | .2517E+01 | 0. | .2315E+00 |
| 7 | 1 | 3 | .2517E+01 | 0. | .4630E+00 | 7 | 2 | 1 | .2469E+01 | .4910E+00 | C. |
| 7 | 2 | 2 | .2469E+01 | .4910E+00 | .2315E+00 | 7 | 2 | 3 | .2469E+01 | .4910E+00 | .4630E+00 |
| 7 | 3 | 1 | .2325E+01 | .9632E+00 | 0. | 7 | 3 | 2 | .2325E+01 | .9632E+00 | .2315E+00 |
| 7 | 3 | 3 | .2325E+01 | .9632E+00 | .4630E+00 | 7 | 4 | 1 | .2093E+01 | .1398E+01 | 0. |
| 7 | 4 | 2 | .2093E+01 | .1398E+01 | .2315E+00 | 7 | 4 | 3 | .2093E+01 | .1398E+01 | .4630E+00 |
| 7 | 5 | 1 | .1780E+01 | .1780E+01 | 0. | 7 | 5 | 2 | .1700E+01 | .1700E+01 | .2315E+00 |
| 7 | 5 | 3 | .1780E+01 | .1780E+01 | .4630E+00 | | | | | | |

GRADIENTS FOR NEXT BLOCK GENERATION
_____

```
        G( 1) =  .100E+01        G( 2) =  .100E+01
        G( 3) =  .100E+01        G( 4) =  .100E+01
        G( 5) =  .100E+01        G( 6) =  .100E+01
        G( 7) =  .100E+01        G( 8) =  .100E+01
        G( 9) =  .100E+01        G(10) =  .100E+01
        G(11) =  .100E+01        G(12) =  .100E+01
```

MESH GENERATION BLOCK   IN CYLINDRICAL COORDINATE SYSTEM 2
FROM I J K   5 1 3 TO I J K   7 5 7

GLOBAL CYLINDRICAL CCORDINATES OF POINTS GENERATED

I	J	K	R	THETA	Z	I	J	K	R	THETA	Z
5	1	3	.2447E+01	0.	.4630E+00	5	1	4	.2447E+01	0.	.8326E+00
5	1	5	.2447E+01	0.	.1203E+01	5	1	6	.2447E+01	0.	.1572E+01
5	1	7	.2447E+01	0.	.1942E+01	5	2	3	.2447E+01	.1125E+02	.4630E+00
5	2	4	.2447E+01	.1125E+02	.8328E+00	5	2	5	.2447E+01	.1125E+02	.1203E+01
5	2	6	.2447E+01	.1125E+02	.1572E+01	5	2	7	.2447E+01	.1125E+02	.1942E+01
5	3	3	.2447E+01	.2250E+02	.463CE+00	5	3	4	.2447E+01	.2250E+02	.8328E+00
5	3	5	.2447E+01	.2250E+02	.1203E+01	5	3	6	.2447E+01	.2250E+02	.1572E+01
5	3	7	.2447E+01	.2250E+02	.1942E+01	5	4	3	.2447E+01	.3375E+02	.4630E+00
5	4	4	.2447E+01	.3375E+02	.8328E+00	5	4	5	.2447E+01	.3375E+02	.1203E+01
5	4	6	.2447E+01	.3375E+02	.1572E+01	5	4	7	.2447E+01	.3375E+02	.1942E+01
5	5	3	.2447E+01	.4500E+02	.4630E+00	5	5	4	.2447E+01	.4500E+02	.8326E+00
5	5	5	.2447E+01	.4500E+02	.1203E+01	5	5	6	.2447E+01	.4500E+02	.1572E+01
5	5	7	.2447E+01	.4500E+02	.1942E+01	6	1	3	.2482E+01	0.	.4630E+00
6	1	4	.2482E+01	0.	.8326E+00	6	1	5	.2482E+01	0.	.1203E+01
6	1	6	.2482E+01	0.	.1572E+01	6	1	7	.2482E+01	0.	.1942E+01
6	2	3	.2482E+01	.1125E+02	.4630E+00	6	2	4	.2482E+01	.1125E+02	.8327E+00
6	2	5	.2482E+01	.1125E+02	.1203E+01	6	2	6	.2482E+01	.1125E+02	.1572E+01
6	2	7	.2482E+01	.1125E+02	.1942E+01	6	3	3	.2482E+01	.2250E+02	.4630E+00
6	3	4	.2482E+01	.2250E+02	.8327E+00	6	3	5	.2482E+01	.2250E+02	.1203E+01
6	3	6	.2482E+01	.2250E+02	.1572E+01	6	3	7	.2482E+01	.2250E+02	.1942E+01
6	4	3	.2482E+01	.3375E+02	.4630E+00	6	4	4	.2482E+01	.3375E+02	.8327E+00
6	4	5	.2482E+01	.3375E+02	.1203E+01	6	4	6	.2482E+01	.3375E+02	.1572E+01
6	4	7	.2482E+01	.3375E+02	.1942E+01	6	5	3	.2482E+01	.4500E+02	.4630E+00
6	5	4	.2482E+01	.4500E+02	.8328E+00	6	5	5	.2482E+01	.4500E+02	.1203E+01
6	5	6	.2482E+01	.4500E+02	.1572E+01	6	5	7	.2482E+01	.4500E+02	.1942E+01
7	1	3	.2517E+01	0.	.4630E+00	7	1	4	.2517E+01	0.	.8326E+00
7	1	5	.2517E+01	0.	.1203E+01	7	1	6	.2517E+01	0.	.1572E+01
7	1	7	.2517E+01	0.	.1942E+01	7	2	3	.2517E+01	.1125E+02	.4630E+00
7	2	4	.2517E+01	.1125E+02	.8328E+00	7	2	5	.2517E+01	.1125E+02	.1203E+01
7	2	6	.2517E+01	.1125E+02	.1572E+01	7	2	7	.2517E+01	.1125E+02	.1942E+01
7	3	3	.2517E+01	.2250E+02	.4630E+00	7	3	4	.2517E+01	.2250E+02	.8326E+00
7	3	5	.2517E+01	.2250E+02	.1203E+01	7	3	6	.2517E+01	.2250E+02	.1572E+01
7	3	7	.2517E+01	.2250E+02	.1942E+01	7	4	3	.2517E+01	.3375E+02	.4630E+00
7	4	4	.2517E+01	.3375E+02	.8328E+00	7	4	5	.2517E+01	.3375E+02	.1203E+01
7	4	6	.2517E+01	.3375E+02	.1572E+01	7	4	7	.2517E+01	.3375E+02	.1942E+01
7	5	3	.2517E+01	.4500E+02	.4630E+00	7	5	4	.2517E+01	.4500E+02	.8326E+00
7	5	5	.2517E+01	.4500E+02	.1203E+01	7	5	6	.2517E+01	.4500E+02	.1572E+01
7	5	7	.2517E+01	.4500E+02	.1942E+01						

MESH GENERATION BLOCK   IN CYLINDRICAL COORDINATE SYSTEM 2
FROM I J K 5 1 3 TO I J K 7 5 7

GLOBAL CARTESIAN   COORDINATES OF POINTS GENERATED

I	J	K	X	Y	Z
5	1	3	.2447E+01	0.	.4630E+00
5	1	4	.2447E+01	0.	.1203E+01
5	1	5	.2447E+01	0.	.1942E+01
5	2	3	.2400E+01	.4774E+00	.8328E+00
5	2	4	.2400E+01	.4774E+00	.1572E+01
5	2	5	.2400E+01	.4774E+00	.4630E+00
5	3	3	.2261E+01	.9364E+00	.1203E+01
5	3	4	.2261E+01	.9364E+00	.1942E+01
5	3	5	.2261E+01	.9364E+00	.8328E+00
5	4	3	.2035E+01	.1359E+01	.1572E+01
5	4	4	.2035E+01	.1359E+01	.4630E+00
5	4	5	.2035E+01	.1359E+01	.1203E+01
5	5	3	.1730E+01	.1730E+01	.1942E+01
5	5	4	.1730E+01	.1730E+01	.8328E+00
5	5	5	.1730E+01	.1730E+01	.1572E+01
6	1	3	.2402E+01	0.	.4630E+00
6	1	4	.2434E+01	0.	.1203E+01
6	1	5	.2434E+01	.4842E+00	.1942E+01
6	2	3	.2434E+01	.4842E+00	.8328E+00
6	2	4	.2293E+01	.9498E+00	.1572E+01
6	2	5	.2293E+01	.9498E+00	.1203E+01
6	3	3	.2293E+01	.9498E+00	.1942E+01
6	3	4	.2064E+01	.1379E+01	.1572E+01
6	3	5	.2064E+01	.1379E+01	.4630E+00
6	4	3	.2064E+01	.1379E+01	.1203E+01
6	4	4	.1755E+01	.1755E+01	.1942E+01
6	4	5	.1755E+01	.1755E+01	.1572E+01
6	5	3	.1755E+01	.1755E+01	.1203E+01
7	1	3	.2517E+01	0.	.1942E+01
7	1	4	.2517E+01	.4910E+00	.1572E+01
7	1	5	.2517E+01	.4910E+00	.1203E+01
7	2	3	.2469E+01	.4910E+00	.1942E+01
7	2	4	.2469E+01	.9632E+00	.8328E+00
7	2	5	.2325E+01	.9632E+00	.1572E+01
7	3	3	.2325E+01	.9632E+00	.4630E+00
7	3	4	.2093E+01	.1398E+01	.1203E+01
7	3	5	.2093E+01	.1398E+01	.1942E+01
7	4	3	.2093E+01	.1398E+01	.8328E+00
7	4	4	.1730E+01	.1730E+01	.1942E+01
7	4	5	.1730E+01	.1730E+01	.1772E+01
7	5	6	.1730E+01	.1730E+01	

GRADIENTS FOR NEXT BLOCK GENERATION

G(1) = .100E+01	G(2) = .100E+01
G(3) = .100E+01	G(4) = .100E+01
G(5) = .100E+01	G(6) = .100E+01
G(7) = .100E+01	G(8) = .100E+01
G(9) = .100E+02	G(10) = .100E+01
G(11) = .100E+01	G(12) = .100E+01

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MESH GENERATION BLOCK IN CYLINDRICAL COORDINATE SYSTEM 2
FROM IJK 5 1 7 TO IJK 7 5 9

GLOBAL CYLINDRICAL COORDINATES OF POINTS GENERATED

I	J	K	R	THETA	Z
5	1	7	.2447E+01	0.	.1942E+01
5	1	9	.2447E+01		.2405E+01
5	2	8	.2447E+01	.1125E+02	.2174E+01
5	3	7	.2447E+01	.2250E+02	.1942E+01
5	3	9	.2447E+01	.2250E+02	.2405E+01
5	4	8	.2447E+01	.3375E+02	.2174E+01
5	5	7	.2447E+01	.4500E+02	.1942E+01
5	5	9	.2447E+01	.4500E+02	.2405E+01
6	1	8	.2482E+01	0.	.2174E+01
6	2	7	.2482E+01	.1125E+02	.1942E+01
6	2	9	.2482E+01	.1125E+02	.2405E+01
6	3	8	.2482E+01	.2250E+02	.2174E+01
6	4	7	.2482E+01	.3375E+02	.1942E+01
6	4	9	.2482E+01	.3375E+02	.2405E+01
6	5	8	.2482E+01	.4500E+02	.2174E+01
7	1	7	.2517E+01	0.	.1942E+01
7	1	9	.2517E+01	.1125E+02	.2405E+01
7	2	8	.2517E+01	.2250E+02	.2174E+01
7	3	7	.2517E+01	.2250E+02	.1942E+01
7	3	9	.2517E+01	.3375E+02	.2405E+01
7	4	8	.2517E+01	.3375E+02	.2174E+01
7	4	9	.2517E+01	.4500E+02	.1942E+01
7	5	8	.2517E+01	.4500E+02	.2405E+01

MESH GENERATION BLOCK IN CYLINDRICAL COORDINATE SYSTEM 2
FROM IJK 5 1 7 TO IJK 7 5 9

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

I	J	K	X	Y	Z
5	1	7	.2447E+01	0.	.1942E+01
5	1	8	.2400E+01	.4774E+00	.2405E+01
5	2	9	.2400E+01	.4774E+00	.2174E+01
5	3	8	.2261E+01	.9364E+00	.1942E+01
5	3	9	.2035E+01	.1359E+01	.2405E+01
5	5	7	.1730E+01	.1730E+01	.2174E+01
6	1	7	.2482E+01	0.	.1942E+01
6	2	8	.2434E+01	.4842E+00	.2174E+01
6	2	9	.2293E+01	.9498E+00	.2405E+01
6	3	8	.2293E+01	.9498E+00	.2174E+01
6	4	7	.2064E+01	.1379E+01	.1942E+01
6	4	9	.1755E+01	.1755E+01	.2405E+01
7	1	7	.2517E+01	0.	.1942E+01
7	2	8	.2469E+01	.4910E+00	.2174E+01
7	3	7	.2325E+01	.9632E+00	.1942E+01
7	3	9	.2093E+01	.1398E+01	.2405E+01
7	4	8	.2093E+01	.1398E+01	.2405E+01

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MESH GENERATION BLOCK IN CYLINDRICAL COORDINATE SYSTEM 2
FROM IJK 5 1 7 TO IJK 7 5 9

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

I	J	K	X	Y	Z
7	5	7	.1780E+01	.1780E+01	.1942E+01
7	5	9	.1780E+01	.1780E+01	.2405E+01
7	5	8	.1780E+01	.1780E+01	.2174E+01

MESH GENERATION END IN CARTESIAN COORDINATE SYSTEM 1
FROM IJK 1 1 1 TO IJK 13 13 21

GLOBAL CARTESIAN COORDINATES OF POINTS GENERATED

I	J	K	X	Y	Z		I	J	K	X	Y	Z
1	1	1	.9400E+00	0.	.4630E+00		1	1	2	.9400E+00	0.	.2315E+00
1	1	3	.9400E+00	0.	.1203E+01		1	1	4	.1201E+01	0.	.8543E+00
1	1	5	.1543E-01	0.	.1942E+01		1	1	6	.2045E+01	0.	.1554E+01
1	1	7	.2145E-01	0.	.2405E+01		1	1	8	.2145E+01	0.	.2174E+01
1	2	1	.9221E+00	.1331E+00	.2405E+01		1	2	3	.9221E+00	.1031E+00	.4631E+00
1	2	2	.1131E+01	.2134E+00	.2315E+00		1	2	5	.1401E+01	.2438E+00	.1203E+01
1	2	6	.1671E+01	.2741E+00	.8489E+00		1	2	7	.1880E+01	.3044E+00	.1942E+01
1	2	8	.1880E+01	.3044E+00	.1556E+01		1	2	9	.1880E+01	.3595E+00	.2405E+01
1	3	1	.8603E+00	.3595E+00	.4630E+00		1	3	2	.8603E+00	.3520E+00	.2315E+00
1	3	3	.8677E+00	.3446E+00	.1203E+01		1	3	6	.9447E+00	.3371E+00	.8435E+00
1	3	5	.1162E+01	.3297E+00	.1942E+01		1	3	8	.1329E+01	.3297E+00	.1561E+01
1	3	7	.1456E+01	.3297E+00	.2405E+01		1	3	1	.1456E+01	.5224E+00	.2174E+01
1	4	9	.1456E+01	.3297E+00	.2315E+01		1	4	5	.7616E+00	.5224E+00	.4630E+00
1	4	2	.7816E+00	.5224E+00	.1567E+01		1	4	7	.8937E+00	.4394E+00	.1203E+01
1	4	6	.9596E+00	.3976E+00	.8381E+00		1	4	2	.1005E+01	.3564E+00	.1942E+01
1	4	1	.1005E+01	.3564E+00	.2405E+01		1	5	6	.6650E+00	.6650E+00	.2315E+00
1	5	3	.6650E+00	.6650E+00	.4630E+00		1	5	8	.6650E+00	.6650E+00	.1203E+01
1	5	7	.6650E+00	.6650E+00	.1942E+01		1	5	3	.1317E+01	.6650E+00	.1572E+01
1	5	5	.5650E+00	.6650E+00	.2405E+01		2	1	7	.1317E+01	.6650E+00	.2174E+01
2	1	8	.1317E+01	0.	.4630E+00		2	1	2	.1769E+01	0.	.2315E+00
2	1	3	.1769E+01	0.	.1203E+01		2	1	6	.2221E+01	0.	.1942E+01
2	1	7	.2221E+01	0.	.2405E+01		2	2	8	.2221E+01	.2566E+00	.2174E+01
2	2	1	.1293E+01	.2595E+00	.4630E+00		2	2	2	.1457E+01	.2812E+00	.2315E+00
2	2	3	.1656E+01	.3029E+00	.1203E+01		2	2	6	.1856E+01	.3248E+00	.8449E+00
2	2	7	.2025E+01	.3595E+00	.1942E+01		2	2	8	.2020E+01	.3469E+00	.1761E+01
2	3	3	.2013E+01	.3469E+00	.2405E+01		2	3	1	.1234E+01	.5110E+00	.2174E+01
2	3	2	.1209E+01	.5085E+00	.4630E+00		2	3	3	.1434E+01	.4491E+00	.1203E+01
2	3	6	.1318E+01	.5009E+00	.8409E+00		2	3	7	.1675E+01	.4887E+00	.1942E+01
2	3	8	.1552E+01	.4769E+00	.1664E+01		2	3	9	.1640E+01	.4636E+00	.2405E+01
2	4	1	.1660E+01	.4776E+00	.2174E+01		2	4	5	.1074E+01	.7172E+00	.2315E+00
2	4	3	.1107E+01	.7398E+00	.4630E+00		2	4	6	.1127E+01	.6975E+00	.0369E+00
2	4	6	.1100E+01	.6525E+00	.1203E+01		2	4	7	.1194E+01	.6052E+00	.1569E+01
2	5	3	.1275E+01	.6153E+00	.1942E+01		2	5	3	.1247E+01	.5803E+00	.2174E+01
2	5	7	.1211E+01	.6153E+00	.2405E+01		2	5	5	.9312E+00	.9312E+00	.4630E+00
2	5	9	.8943E+00	.8943E+00	.2315E+00							

MESH GENERATION END   IN CARTESIAN   COORDINATE SYSTEM 1
FROM I J K I TO I J K I3 I3 Z1

GLOBAL CARTESIAN   COORDINATES OF POINTS GENERATED

MESH GENERATION END   IN CARTESIAN   COORDINATE SYSTEM   1
FROM I J K   1 1 1 TO I J K 13 13 21

GLOBAL CARTESIAN   COORDINATES OF POINTS GENERATED

MESH GENERATION END   IN CARTESIAN   COORDINATE SYSTEM 1

FROM I J K   I I VG I J K 13 13 21

GLOBAL CARTESIAN   COORDINATES OF POINTS GENERATED

K	J	I	X	Y	Z
1	1	1	.2325E+01	.9632E+00	0.
1	1	2	.2325E+01	.9632E+00	.4630E+00
1	1	3	.2325E+01	.9632E+00	.1203E+01
1	1	4	.2325E+01	.9632E+00	.1942E+01
1	1	5	.2325E+01	.9632E+00	.2405E+01
1	4	6	.2093E+01	.1390E+01	.2315E+00
1	4	7	.2093E+01	.1390E+01	.8328E+00
1	4	8	.2093E+01	.1390E+01	.1772E+01
1	5	9	.2093E+01	.1390E+01	.2174E+01
1	5	10	.1700E+01	.1700E+01	0.
1	5	11	.1700E+01	.1700E+01	.4630E+00
1	5	12	.1700E+01	.1700E+01	.1203E+01
1	5	13	.1700E+01	.1700E+01	.1942E+01
1	5	14	.1700E+01	.1700E+01	.2405E+01

K	J	I	X	Y	Z
1	1	2	.2325E+01	.9632E+00	.2315E+00
1	1	3	.2325E+01	.9632E+00	.8328E+00
1	1	4	.2325E+01	.9632E+00	.1572E+01
1	1	5	.2325E+01	.9632E+00	.2174E+01
1	4	6	.2093E+01	.1390E+01	0.
1	4	7	.2093E+01	.1390E+01	.1203E+01
1	4	8	.2093E+01	.1390E+01	.1942E+01
1	4	9	.2093E+01	.1390E+01	.2405E+01
1	5	2	.1700E+01	.1700E+01	.2315E+00
1	5	6	.1700E+01	.1700E+01	.8328E+00
1	5	8	.1700E+01	.1700E+01	.1572E+01
1	5	5	.1700E+01	.1700E+01	.2174E+01

DATA FOR 24 ELEMENTS HAVE BEEN READ

ELEMENT
NO. TYPE

ELEMENT
NO. TYPE

	NODES			NODAL POINT COORDINATES				NODES			NODAL POINT COORDINATES		
	I	J	K	X	Y	Z		I	J	K	X	Y	Z

11 BRICKM MATERIAL NO. 1

12 BRICKM MATERIAL NO. 1

13 BRICKM MATERIAL NO. 1

14 BRICKM MATERIAL NO. 1

15 BRICKM MATERIAL NO. 1

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ELEMENT NO. TYPE — NODES I J K — NODAL POINT COORDINATES X Y Z — NODES I J K — NODAL POINT COORDINATES X Y Z

16 BRICK MATERIAL NO. 1

17 BRICK MATERIAL NO. 2

18 BRICK MATERIAL NO. 2

19 BRICK MATERIAL NO. 2

20 BRICK MATERIAL NO. 2

ELEMENT
NO. TYPE

NODES
I J K

NODAL POINT COORDINATES
X Y Z

21 BRICK MATERIAL NO. 2

22 BRICK MATERIAL NO. 2

23 BRICK MATERIAL NO. 2

24 BRICK MATERIAL NO. 2

BOUNDARY CONDITIONS.

ELEMENT NUMBER	ELEMENT I J K	TYPE	NODE OR FACE	VALUE		
1	1 1 1	UZ	3	-.1192E-01		
		UZ	10	-.1192E-01		
		UZ	2	-.1192E-01		
		UZ	11	-.1038E-01		
		UZ	9	-.210AE-01		
		UZ	12	-.210AE-01		
		PRESSURE	4	-.1425E+04	.1425E+04	.1425E+04
		SLOPE	5	0.		
2	1 3 1	UZ	3	-.1192E-01		
		UZ	10	-.1192E-01		
		UZ	11	-.1038E-01		
		UZ	12	-.210AE-01		
		PRESSURE	4	-.1425E+04	.1425E+04	.1425E+04
		SLOPE	2	0.		
3	5 1 1	UZ	3	0.		
		UZ	10	0.		
		UZ	11	-.5460E-02		
		SLOPE	9	-.5460E-02		
		SLOPE	2	0.		
4	3 3 1	UZ	3	0.		
		UZ	10	0.		
		UZ	11	-.5460E-02		
		SLOPE	2	0.		
5	1 1 3	PRESSURE	4	.1425E+04	.1425E+04	.1425E+04
		SLOPE	5	0.		
6	1 3 3	PRESSURE	4	.1425E+04	.1425E+04	.1425E+04
		SLOPE	2	0.		
7	5 1 3	SLOPE	9	0.		
8	3 3 3	SLOPE	2	0.		
9	1 1 5	PRESSURE	4	.1425E+04	.1425E+04	.1425E+04
		SLOPE	5	0.		
10	1 3 5	PRESSURE	4	.1425E+04	.1425E+04	.1425E+04
		SLOPE	2	0.		
11	3 1 5	SLOPE	5	0.		
12	3 3 5	SLOPE	2	0.		
13	1 1 7	UZ	7	-.2970E-02		
		UZ	18	-.2060E-02		
		UZ	6	-.1040E-02		

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BOUNDARY CONDITIONS,

ELEMENT NUMBER	ELEMENT I	J	K	TYPE	NODE OR FACE	VALUE			
13	1	1	7	UZ	19	-.2960E-02			
				UZ	17	-.2000E-02			
				UZ	8	-.3470E-02			
				UZ	20	-.2650E-02			
				PRESSURE	5	-.2150E-02	.1425E+06	.1425E+06	.1425E+06
				SLOPE	5	-.1425E+06			
14	1	3	7	UZ	7	-.3410E-02			
				UZ	18	-.3170E-02			
				UZ	19	-.3840E-02			
				UZ	8	-.4620E-02			
				UZ	20	-.4350E-02			
				PRESSURE	4	.1425E+06	.1425E+06	.1425E+06	.1425E+06
				SLOPE	2	0.			
15	3	1	7	UZ	7	-.1530E-02			
				UZ	18	-.1530E-02			
				UZ	6	-.1530E-02			
				UZ	19	-.1990E-02			
				UZ	17	-.1680E-02			
				SLOPE	5	0.			
16	3	3	7	UZ	7	-.1530E-02			
				UZ	18	-.1530E-02			
				UZ	19	-.2340E-02			
				SLOPE	2	0.			
17	5	1	1	SLOPE	6	0.			
				SLOPE	5	0.			
18	5	3	1	SLOPE	6	0.			
				SLOPE	2	0.			
19	5	1	3	SLOPE	5	0.			
20	5	3	3	SLOPE	2	0.			
21	5	1	5	SLOPE	5	1.			
22	5	3	5	SLOPE	2	0.			
23	5	1	7	SLOPE	5	0.			
24	5	3	7	SLOPE	2	0.			

TIME IN SETUP   =   3.438 SECONDS

TIME IN FORMKF   =   10.951 SECONDS

TIME IN PREFRONT = 1.262

TOTAL NUMBER OF D.O.F.S =   624

D.O.F. IN FRONT = 144

MAXIMUM ACTIVE STORAGE = 19802

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TOTAL NICKNAME STORAGE =   688

BUFFER LENGTH =   7197

TIME IN FORWARD ELIMINATION =   33.827

NUMBER OF SECTORS(PRUS) =   1452

TIME IN BACKSUBSTITUTION =   2.785

TIME IN ZIPP       =     37.898 SECONDS
```

BLOCK   OPTION

BOUNDS

	MIN	MAX			MIN	MAX
X	-.1000E+21	.1000E+21		I	0	0
Y	-.1000E+21	.1000E+21		J	0	0
Z	-.1000E+21	.1000E+21		K	0	0

PRINT LEVEL = 4

STRESS POINTS FOR BRICK(DEGEN) ELEMENTS

POINT	S1	S2	S3
1	-1.000	-1.000	-1.000
2	1.000	-1.000	-1.000
3	1.000	1.000	-1.000
4	-1.000	1.000	-1.000
5	-1.000	-1.000	1.000
6	1.000	-1.000	1.000
7	1.000	1.000	1.000
8	-1.000	1.000	1.000
9	0.000	0.000	0.000

STRESS POINTS FOR PRISM ELEMENTS

POINT	S1	S2	S3	S4
1	1.000	0.000	0.000	-1.000
2	0.000	1.000	0.000	-1.000
3	0.000	0.000	1.000	-1.000
4	1.000	0.000	0.000	1.000
5	0.000	1.000	0.000	1.000
6	0.000	0.000	1.000	1.000
7	.333	.333	.333	0.000

STRESS POINTS FOR WEDGE ELEMENTS

POINT	S1	S2	S3
1	.050	0.000	-1.000
2	1.000	0.000	-1.000
3	1.000	1.000	-1.000
4	.050	0.000	1.000
5	1.000	0.000	1.000
6	1.000	1.000	1.000
7	.667	.500	0.000

STRESS POINTS FOR TETRA ELEMENTS

POINT	S1	S2	S3	S4
1	1.000	0.000	0.000	0.000
2	0.000	1.000	0.000	0.000
3	0.000	0.000	1.000	0.000
4	0.000	0.000	0.000	1.000
5	.250	.250	.250	.250

DISPLACEMENTS FOR BRICKM ELEMENT NO. 1 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKM ELEMENT NO. 1 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICK ELEMENT NO. 2 MATERIAL = 1

STRESSES FOR BRICK ELEMENT NO. 2 MATERIAL = 1

POINT

DISPLACEMENTS FOR BRICK ELEMENT NO. 3 MATERIAL = 1

I	J	K	U	V	W	H

STRESSES FOR BRICK ELEMENT NO. 3 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICKH ELEMENT NO. 4 MATERIAL = 1

I	J	K	U	V	W	H
3	3	1	.9492E-02	.3927E-02	.1092E-01	.1811E+00
5	5	1	.3880E-02	.1801E-02	.3344E-21	.2473E-08
5	3	1	.3422E-02	.3422E-02	.1566E-21	.2456E+00
3	5	1	.7777E-02	.7777E-02	.1092E-01	.1856E+00
3	3	2	.6244E-02	.2767E-02	.9745E-02	.1995E+00
5	5	2	.3661E-02	.1733E-02	.3231E-03	.1931E+00
5	3	2	.3304E-02	.3304E-02	.3249E-03	.1958E+00
3	5	2	.5321E-02	.5321E-02	.1021E-01	.1993E+00
4	3	1	.6009E-02	.2570E-02	.5460E-02	
4	5	1	.3021E-02	.2702E-02	.8996E-21	
5	4	1	.5101E-02	.5101E-02	.5460E-02	
3	4	1	.8062E-02	.5758E-02	.1092E-01	
4	3	2	.7295E-02	.3082E-02	.1053E-01	
4	5	2	.3799E-02	.1780E-02	.1582E-03	
5	4	2	.3383E-02	.3383E-02	.1569E-03	
3	4	2	.6214E-02	.6214E-02	.1140E-01	
4	3	3	.4582E-02	.1990E-02	.3928E-02	
4	5	3	.3668E-02	.2609E-02	.3254E-03	
5	4	3	.3964E-02	.3964E-02	.4362E-03	
3	4	3	.6020E-02	.3906E-02	.9905E-02	

STRESSES FOR BRICKH ELEMENT NO. 4 MATERIAL = 1

PGINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
28	.16E+01	.66E+00	0.	.13E+04 .94E-02	.11E+04 .30E-02	.11E+04 .45E-02	.69E+02 .11E-01	.55E+01 .86E-03	.16E+02 .25E-02	.11E+04 .51E-02	.11E+04 .46E-02	-.13E+04 .13E-01	.11E+03 .17E-01
29	.23E+01	.94E+00	0.	.16E+04 .43E-C2	.15E+04 .15E-02	.11E+04 .15E-04	.23E+02 .36E-02	.41E+02 .65E-02	.98E+02 .15E+01	.15E+04 .15E+00	.15E+04 .46E-02	-.17E+06 .12E-01	.11E+03 .17E-01
30	.17E+01	.17E+01	0.	.16E+04 .13E-C2	.16E+04 .13E-02	.74E-03 .74E-03	.36E-02 .39E+02	.65E-02 .64E+02	.15E-01 .10E-01	.59E+04 .44E-02	.17E-02 .18E-02	-.11E-01 .11E-01	.57E-01 .15E-01
31	.12E+01	.12E+01	0.	.12E+04 .14E-02	.12E+04 .13E-02	.11E+04 .16E+04	.62E-02 .19E-01	.10E-01 .19E+02	.64E+02 .20E-02	.15E+04 .41E+04	.15E+04 .11E+04	-.18E-01 .13E+04	.9E+02 .12E-03
32	.16E+01	.66E+00	.46E+00	.13E+04 .25E-02	.12E+04 .23E-02	.11E+04 .34E-04	.19E-01 .36E-02	.19E+02 .45E+02	.26E-02 .44E-02	.41E+04 .73E-02	.11E+04 .35E-02	-.12E-01 .12E-01	.12E+03 .20E-01
33	.23E+01	.94E+00	.46E+00	.68E-02 .12E+04	.12E-02 .21E-02	.13E+04 .64E-03	.36E-02 .56E-02	.71E-02 .10E+03	.16E-01 .40E+02	.12E-04 .60E-02	.30E-02 .12E+04	-.12E-01 .13E-01	.18E-01 .47E+02
34	.17E+01	.17E+01	.46E+00	.17E-02 .12E+04	.18E-02 .12E+04	.66E-03 .12E+04	.11E-02 .10E+02	.27E-02 .34E+02	.64E-02 .34E+02	.27E-02 .12E+04	.14E-02 .12E+04	-.47E-02 .13E+04	.74E-02 .76E-02
35	.12E+01	.12E+01	.46E+00	.21E-03 .13E+04	.30E-03 .13E+04	.68E-03 .13E-04	.28E-02 .71E-01	.56E-02 .16E-01	.54E-02 .12E-01	.29E-02 .55E-02	.17E-02 .45E-02	-.47E-02 .14E-01	.12E-02 .19E-01
36	.17E+01	.11E+01	.23E+00	.28E-02 .13E+04	.80E-03 .13E+04	.29E-02 .13E+04	.67E-02 .42E+02	.62E-02 .39E+02	.86E-02 .55E+02	.57E-02 .12E+04	.27E-02 .13E+04	-.75E-02 .14E+04	.13E-01 .8E+02

DISPLACEMENTS FOR BRICKH ELEMENT NO. 5 MATERIAL = 1

I	J	K	U	V	W	H

STRESSES FOR BRICKH ELEMENT NO. 5 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICKM ELEMENT NO. 7 MATERIAL = 1

I	J	K	U	V	W	M

STRESSES FOR BRICKM ELEMENT NO. 7 MATERIAL = 1

POINT	K	V	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZM GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICKH ELEMENT NO.   8 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKH ELEMENT NO.   8 MATERIAL = 1

PCINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
64													
65													
66													
67													
68													
69													
70													
71													
72													

39

DISPLACEMENTS FOR BRICKM ELEMENT NO.   9 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKM ELEMENT NO.   9 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

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DISPLACEMENTS FOR BRICKM ELEMENT NO. 1C MATERIAL = 1

STRESSES FOR BRICKM ELEMENT NO. 10 MATERIAL = 1

DISPLACEMENTS FOR BRICKM ELEMENT NO. 11 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKM ELEMENT NO. 11 MATERIAL = 1

PCINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICK ELEMENT NO. 12 MATERIAL = 1

STRESSES FOR BRICK ELEMENT NO. 12 MATERIAL = 1

DISPLACEMENTS FOR BRICKH ELEMENT NO. 13 MATERIAL = 1

STRESSES FOR BRICKH ELEMENT NO. 13 MATERIAL = 1

44

DISPLACEMENTS FOR BRICKM ELEMENT NO. 14 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKM ELEMENT NO. 14 MATERIAL = 1

PGINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
118													
119													
120													
121													
122													
123													
124													
125													
126													

45

DISPLACEMENTS FOR BRICKH ELEMENT NO. 15 MATERIAL = 1

I	J	K	U	V	W
3	1	7	.3332E-02	.1165E-09	-.2157E-02
5	1	7	.3089E-02	-.1244E-12	-.1155E-02
5	3	7	.362vE-02	.1830E-02	-.1171E-02
3	3	7	.4643E-02	.3901E-02	-.4023E-02
3	1	9	.2705E-02	.6423E-10	-.1840E-02
5	1	9	.2446E-02	-.1243E-12	-.1530E-02
5	3	9	.3143E-02	.165vE-02	-.1530E-02
3	3	9	.4100E-02	.4090E-02	.2972E-02
3	1	7	.326zE-02	-.1205E-09	-.1655E-02
5	3	7	.3249F-02	.8446E-03	.1102E-02
3	2	7	.3997E-02	.2193E-02	.2588E-02
3	2	7	.3980E-02	.1072E-02	.2821E-02
3	1	8	.3151E-02	.1804E-09	.2163E-02
9	3	8	.294vE-02	.632vE-12	-.1351E-02
5	3	8	.3529E-02	.1005E-02	.3410E-02
3	1	9	.2533E-02	.7088E-10	.1660E-02
5	2	9	.2661E-02	.3870E-03	-.1530E-02
5	3	9	.3446E-02	.7508E-03	.1990E-02
3	3	9	.3490E-02	.1529E-02	.2082E-02

STRESSES FOR BRICKH ELEMENT NO. 15 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
127	.23E+01	0.	.19E+01	-.12E+04 -.25E-03	.12E+04 .86E-03	-.13E+04 .13E+04	.85E+01 .13E+01	.13E+01 .13E+01	.81E+02 .65E-02	.12E+04 .29E-02	.12E+04 .03E-03	-.13E+04 -.30E-02	.63E+02 .67E-02
128	.24E+01	0.	.19E+01	-.12E+04 -.12E+04	-.12E+04 -.66E-03	-.73E-03 -.12E+04	.13E-02 .64E+00	-.20E-03 .64E-01	.42E+02 .42E+02	.12E+04 .12E+04	.12E+04 -.12E+04	.13E+04 -.13E+04	.65E+02 .65E+02
129	.23E+01	.94E+00	.19E+01	-.30E-02 -.12E-02	-.16E-02 .12E+04	-.79E-03 -.13E+04	.10E-03 .64E+02	.10E-04 .10E+04	.66E-02 .16E-02	.16E-02 .12E+04	.16E-02 -.12E+04	-.54E-02 -.14E+04	.78E-02 .65E+02
130	.19E+01	.65E+00	.19E+01	.13E+04 -.10E-02	-.13E+04 -.19E-02	-.13E+04 -.77E-03	-.49E+01 -.77E-03	.13E+02 -.20E-02	.62E+02 .67E+02	-.13E+04 .29E-02	-.13E+04 -.13E-02	.19E+04 -.19E+04	.49E-02 .70E-02
131	.23E+01	.65E+00	.24E+01	.13E+04 -.27E-02	-.13E+04 -.18E-03	-.13E+04 .27E-02	-.84E+02 -.10E-01	-.29E-02 .37E-02	-.29E+02 .44E-02	-.13E+04 .40E-02	-.13E+04 .35E-02	.74E-02 -.74E-02	.72E-02 .11E-01
132	.24E+01	0.	.24E+01	-.28E-02 -.13E-02	-.13E+04 -.21E-02	-.13E+04 .21E-02	-.71E+01 .11E-02	.77E+00 .12E-03	-.32E-03 -.64E+01	-.13E+04 .22E-02	.21E-02 -.13E+04	-.29E-02 -.13E+04	.32E-02 .51E-02
133	.23E+01	.94E+00	.24E+01	-.59E-03 .14E-02	-.14E-02 .13E+04	-.61E-03 .14E+04	.11E+01 .68E+01	.23E-01 .12E-03	.19E-02 -.64E+01	-.13E+04 .1vE-02	-.13E+04 -.19E-03	-.12E-02 -.13E+04	.26E-02 .17E-02
134	.16E+01	.61E+00	.24E+01	.34E-02 .14E-02	-.13E+04 -.13E+04	.77E-03 -.77E-03	-.10E-02 -.64E+02	-.25E-03 -.11E-01	-.67E-03 -.16E-01	.15E+04 .65E-02	-.6vE+03 -.6vE-03	-.17E-02 -.14E+04	.32E-02 .74E-02
135	.23E+01	.43E+00	.22E+01	-.24E-02 -.26E-02	-.18E-02 .19E-02	-.13E+04 .57E-03	-.10E-01 -.29E-02	.17E-05 .13E-02	.22E+02 .3vE-02	.45E-02 .23E-02	.29E-02 -.13E+04	-.71E-02 -.13E+04	.12E-01 .63E-02

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DISPLACEMENTS FOR BRICKM ELEMENT NO. 16 MATERIAL = 1

I	J	K	U	V	W
3	3	7	.4643E-02	.3501E-02	-.4023E-02
5	3	7	.3624E-02	.1870E-02	-.1171E-02
5	3	7	.3521E-02	.3521E-02	-.1184E-02
3	3	7	.5636E-02	.5636E-02	-.5313E-02
3	3	9	.4106E-02	.4005E-02	-.2570E-02
5	3	9	.3140E-02	.4165E-02	-.1530E-02
5	3	9	.3241E-02	.3241E-02	-.1530E-02
3	5	9	.5927E-02	.5927E-02	-.3410E-02
3	5	7	.3997E-02	.2193E-02	-.2580E-02
5	5	7	.3825E-02	.2792E-02	-.1181E-02
5	4	7	.4290E-02	.4290E-02	-.3401E-02
3	5	7	.4433E-02	.5010E-02	-.5035E-02
3	5	8	.3529E-02	.1387E-02	-.3610E-02
5	3	8	.5005E-02	.5805E-02	-.1351E-02
5	3	8	.3446E-02	.2297E-02	-.1358E-02
3	3	9	.3455E-02	.2566E-02	-.1990E-02
5	5	9	.4285E-02	.4289E-02	-.1530E-02
3	5	9	.5104E-02	.5577E-02	-.2300E-02
					-.3170E-02

X: -.2057E+00, -.2078E+00, -.2068E+00, -.2127E+00, -.2097E+00, -.2147E+00, -.2101E+00, -.2147E+00

STRESSES FOR BRICKM ELEMENT NO. 16 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
136	.19E+01	.65E+00	.19E+01	-.13E+04 / -.13E+04	-.13E+04	-.13E+04	-.47E+02	-.23E+02	.26E-02	-.13E+04	-.13E+04	-.14E+04	.70E+02
137	.23E+01	.34E+00	.19E+01	-.33E-02	-.26E-02	.27E-02	-.74E-02	.37E-02	.44E-02	.35E-02	.75E-03	-.75E-03	.11E-01
138	.17E+01	.17E+01	.19E+01	-.13E+04	-.13E+04	-.13E+04	-.55E+01	.10E+02	.42E+02	-.13E+04	-.13E+04	-.14E+04	.49E+02
139	.12E+01	.12E+01	.19E+01	-.18E-02	-.19E-02	-.77E-03	-.87E-03	.28E-02	.65E-02	.29E-02	-.14E-02	-.14E-02	.78E-02
140	.18E+01	.61E+00	.24E+01	-.13E+04	-.13E+04	-.13E+04	-.22E+02	.30E+02	.30E+02	-.11E+04	-.13E+04	-.14E+04	.63E+02
141	.23E-01	.94E+00	.24E+01	-.94E-04	-.11E-04	-.76E-03	-.35E-02	.47E-02	.47E-02	.21E-02	.17E-02	-.14E+04	.67E-02
142	.17E+01	.17E+01	.24E+01	-.14E+04	-.14E+04	-.13E+04	-.41E+02	.20E+02	.19E+02	.13E+04	.35E-04	-.66E-02	.72E-02
143	.11E+01	.11E+01	.24E+01	-.31E-02	-.27E-02	-.46E-02	-.65E-02	.32E-02	.29E-02	.50E-02	-.37E-03	-.14E+04	.12E-01
144	.18E+01	.11E+01	.22E+01	-.14E+04	-.14E+04	-.13E+04	-.47E+02	-.15E+01	-.15E+01	-.13E+04	-.13E+04	-.14E+04	.76E+02

DISPLACEMENTS FOR BRICK ELEMENT NO. 17 MATERIAL = 2

I	J	K	U	V	W
5	1	1	.3687E-02	-.1161E-12	.1436E-21
5	3	1	.3554E-02	-.1761E-12	.4543E-13
7	1	1	.3457E-02	.1721E-02	.5275E-13
7	3	1	.3860E-02	-.1801E-02	.3344E-21
5	1	3	.3429E-02	-.1099E-12	-.3207E-03
5	3	3	.3398E-02	-.1733E-12	-.2981E-03
7	1	3	.3663E-02	-.1648E-02	-.2729E-03
7	3	3	.3681E-02	.1733E-02	-.3231E-03
6	1	1	.3671E-02	.2151E-12	-.3873E-13
6	3	1	.3719E-02	.8297E-03	-.4204E-13
5	2	1	.3559E-02	.1761E-02	-.4474E-13
7	2	1	.3745E-02	.8701E-03	-.8519E-21
5	1	2	.3613E-02	.5069E-12	.1636E-03
5	3	2	.3581E-02	.6523E-12	-.1244E-03
7	1	2	.3798E-02	.1699E-02	-.1332E-03
7	3	2	.3799E-02	.1780E-02	.1602E-03
6	1	3	.3413E-02	.2035E-12	-.2083E-03
6	3	3	.3470E-02	.7826E-03	-.2981E-03
7	2	3	.3661E-02	.1630E-02	-.2979E-03
6	2	3	.3501E-02	.8298E-02	-.3207E-03

STRESSES FOR BRICK ELEMENT NO. 17 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
145	.24E+01	0.	0.										
146	.25E+01	0.	0.										
147	.23E+01	.96E+00	0.										
148	.23E+01	.96E+00	0.										
149	.24E+01	0.	.46E+00										
150	.25E+01	0.	.46E+00										
151	.23E+01	.96E+00	.46E+00										
152	.23E+01	.96E+00	.46E+00										
153	.24E+01	.96E+00	.23E+00										

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DISPLACEMENTS FOR BRICK ELEMENT NO. 18 MATERIAL = 2

I	J	K	U	V	W

STRESSES FOR BRICK ELEMENT NO. 18 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAX
154													
155													
156													
157													
158													
159													
160													
161													
162													

49

DISPLACEMENTS FOR BRICK ELEMENT NO. 19 MATERIAL = 2

I	J	K	U	V	W
5	1	3	.3429E-02	-.1099E-12	-.3207E-03
7	1	3	.3398E-02	-.1793E-12	-.2561E-03
7	3	3	.3663E-02	.1648E-02	-.2729E-03
5	3	3	.3661E-02	-.1733E-02	-.3231E-03
5	1	5	.3077E-02	-.1167E-02	-.7247E-03
7	1	5	.3047E-02	-.1688E-12	-.7218E-03
7	3	5	.3498E-02	.1613E-02	-.7510E-03
6	1	3	.3487E-02	.1717E-02	-.7380E-05
6	3	3	.3413E-02	.2035E-12	-.2883E-03
7	2	3	.3478E-02	.7826E-03	-.2601E-05
6	2	3	.3661E-02	.1690E-02	-.2979E-03
5	2	3	.3501E-02	.8296E-03	-.3207E-03
5	1	4	.3169E-02	.5361E-12	-.5255E-03
7	1	4	.3181E-02	.8097E-12	.4917E-03
7	3	4	.3490E-02	.1594E-02	.5165E-03
5	3	4	.3491E-02	.1688E-02	.5324E-03
6	1	5	.3060E-02	.1964E-12	-.7231E-03
7	2	5	.3188E-02	.7447E-03	-.7293E-03
6	3	5	.3492E-02	.1665E-02	-.7424E-03
6	2	5	.3289E-02	.8009E-03	.7281E-03

STRESSES FOR BRICK ELEMENT NO. 19 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
163	.24E+01	0.	.86E+00	-.14E+04	.46E+05	-.30E+04	.67E+03	.50E+02	.71E+01	.40E+05	-.14E+04	-.30E+04	.25E+05
164	.25E+01	0.	.46E+00	.49E+03	.16E+02	.69E+04	.50E+04	.43E+05	.61E+06	.16E+02	.49E+03	-.50E+03	.22E+02
165	.23E+01	.96E+00	.46E+00	.61E+03	.42E+05	.69E+04	.60E+03	.29E+02	.28E+02	.42E+05	.61E+03	.69E+04	.25E+05
166	.23E+01	.94E+00	.46E+00	.37E+03	.15E+02	.64E+03	.52E+04	.25E+05	.24E+05	.15E+02	.37E+03	-.64E+03	.21E+02
167	.24E+01	0.	.12E+01	.13E+03	.35E+05	.82E+04	-.15E+05	-.52E+01	.74E+02	.42E+05	-.21E+04	-.82E+04	.29E+05
168	.25E+01	0.	.12E+01	-.17E+03	.12E+02	-.67E+03	-.13E+02	-.45E+06	.64E+05	.15E+02	-.40E+03	-.67E+03	.22E+02
169	.23E+01	.96E+00	.12E+01	-.24E+04	.13E+02	.50E+04	-.17E+05	.98E+02	-.14E+03	.47E+05	-.24E+06	-.50E+03	.22E+02
170	.23E+01	.94E+00	.12E+01	-.49E+03	.45E+05	-.33E+04	-.15E+02	.48E+04	-.22E+03	.16E+02	-.24E+06	-.33E+04	.24E+05
171	.24E+01	.68E+01	.83E+00	-.60E+02	.39E+05	-.60E+04	.10E+04	.41E+05	.19E+04	.45E+05	-.24E+06	-.53E+03	.23E+05

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DISPLACEMENTS FOR BRICK ELEMENT NO. 21 MATERIAL = 2

I	J	K	U	V	W

STRESSES FOR BRICK ELEMENT NO. 21 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMX

DISPLACEMENTS FOR BRICK ELEMENT NO. 22 MATERIAL = 2

I	J	K	U	V	W

STRESSES FOR BRICK ELEMENT NO. 22 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICK ELEMENT NO. 23 MATERIAL = 2

I	J	K	U	V	W

STRESSES FOR BRICK ELEMENT NO. 23 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICK ELEMENT NO. 24 MATERIAL = 2

I	J	K	U	V	W
5	3	7	.3624E-02	.1030E-02	-.1171E-02
7	3	7	.3601E-02	.1707E-02	-.1102E-02
7	5	7	.3496E-02	.3496E-02	-.1203E-02
5	5	7	.3521E-02	.3521E-02	-.1194E-02
5	3	9	.3148E-02	.1654E-02	-.1530E-02
7	3	9	.3155E-02	.1528E-02	-.1351E-02
7	5	9	.3208E-02	.3220E-02	-.1303E-02
5	5	9	.3241E-02	.3241E-02	-.1930E-02
6	3	7	.3633E-02	.1768E-02	-.1177E-02
7	4	7	.3034E-02	.2723E-02	-.1199E-02
6	5	7	.3555E-02	.3509E-02	-.1194E-02
5	4	7	.3025E-02	.2792E-02	-.1101E-02
6	3	9	.3529E-02	.1055E-02	-.1351E-02
7	4	9	.3547E-02	.1677E-02	-.1274E-02
6	5	9	.3456E-02	.3456E-02	-.1299E-02
5	4	9	.3400E-02	.3400E-02	-.1358E-02
6	3	8	.3154E-02	.1507E-02	-.1439E-02
7	4	8	.3472E-02	.2492E-02	-.1371E-02
6	5	8	.3232E-02	.3232E-02	-.1555E-02
5	4	9	.3455E-02	.2566E-02	-.1530E-02

STRESSES FOR BRICK ELEMENT NO. 24 MATERIAL = 2

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
208	.23E+01	.94E+00	.19E+01	.49E+04 -.14E-03	.44E+05 .14E-02	.90E+04 -.77E-03	.10E+05 -.15E-02	.90E+03 .90E-03	.01E+03 .01E-03	.47E+05 .17E-02	.22E+04 .22E-04	-.10E+05 -.78E-03	.29E+05 .29E-03
209	.23E+01	.96E+00	.19E+01	-.12E+05 -.27E-03	.40E+05 .14E-02	.77E-83 .77E-03	-.10E+05 -.15E-02	.70E-04 .70E-04	.70E-04 .70E-04	.17E-02 .17E-02	-.44E+03 -.44E-03	-.78E-03 -.78E-03	.25E-12 .25E-12
210	.18E+01	.18E+01	.19E+01	-.14E-03 -.14E-03	.14E-02 .14E-02	.49E+04 -.43E-03	-.10E-02 -.10E-02	.61E+03 .61E-03	.12E+06 .12E-06	.55E+05 .55E-05	.59E+04 .59E-04	.31E+04 .31E-04	.20E+05 .20E-05
211	.17E+01	.17E+01	.19E+01	.58E-03 .58E-03	.29E+05 .29E-03	.36E+04 .36E-04	-.27E+05 -.27E-05	.93E-04 .93E-04	.11E+03 .11E-03	.17E-02 .17E-02	-.36E-03 -.36E-03	-.51E+03 -.51E-03	.23E-02 .23E-02
212	.23E+01	.94E+00	.24E+01	.58E-03 .58E-03	.65E+03 .65E-03	.44E-03 .44E-03	-.23E-02 -.23E-02	.75E+03 .75E-03	.67E+03 .67E-03	.14E-02 .14E-02	.40E+04 .40E-04	-.10E+04 -.10E-04	.27E+05 .27E-05
213	.23E+01	.96E+00	.24E+01	-.66E+03 -.66E-03	.66E+03 .66E-03	.90E+04 .90E-04	-.29E+05 -.29E-05	.65E-04 .65E-04	.58E-04 .58E-04	.49E+05 .49E-05	.10E+04 .10E-04	-.59E-03 -.59E-03	.23E-02 .23E-02
214	.18E+01	.97E+00	.24E+01	-.34E-04 -.34E-04	.12E-02 .12E-02	-.76E-03 -.76E-03	-.21E-02 -.21E-02	.47E+03 .47E-03	.45E-04 .45E-04	.17E+05 .17E-05	-.44E-03 -.44E-03	-.76E-03 -.76E-03	.25E-12 .25E-12
215	.17E+01	.96E+00	.24E+01	-.34E+05 -.34E-05	.43E+05 .43E-03	-.10E+05 -.10E-05	-.15E+05 -.15E-05	.10E+04 .10E-04	.15E+04 .15E-04	.42E+05 .42E-05	-.90E+03 -.90E-03	-.11E+03 -.11E-03	.24E+05 .24E-05
216	.21E+01	.14E+01	.22E+01	.93E+04 .93E-04	.12E-02 .12E-02	.77E-03 .77E-03	-.13E-02 -.13E-02	.97E-04 .97E-04	.13E-03 .13E-03	.15E+02 .15E-02	-.28E+03 -.28E-03	-.79E-03 -.79E-03	.23E+05 .23E-05

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST				SECOND				THIRD			
	ELEMENT I J K	POINT NO.	STRESS		ELEMENT I J K	POINT NO.	STRESS		ELEMENT I J K	POINT NO.	STRESS	

MATERIAL NUMBER = 1

	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS
SIGMA MAX	1	1	1	4	-.837E+03	1	1	1	1	-.841E+03	1	3	1	10	-.841E+03
SIGMA MIN	3	4	1	20	-.169E+04	3	1	1	21	-.168E+04	3	3	1	29	-.168E+04
TAU MAX	1	1	5	73	.276E+03	1	1	3	41	.276E+03	1	1	7	37	.275E+03
EPS MAX	1	1	1	4	.231E-01	1	1	1	5	.231E-01	1	3	1	18	.231E-01
EPS MIN	1	4	5	73	-.292E-01	1	4	3	41	-.292E-01	1	1	5	77	-.292E-01
GAMMA MAX	1	1	5	73	.436E-01	1	1	3	41	.435E-01	1	1	3	87	.434E-01

MATERIAL NUMBER = 2

	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS
SIGMA MAX	5	3	7	209	.551E+05	5	3	7	210	.547E+05	5	3	1	155	.583E+05
SIGMA MIN	5	1	7	203	-.142E+05	5	1	7	206	-.127E+05	5	1	7	199	-.124E+05
TAU MAX	5	3	1	154	.290E+05	5	3	1	157	.289E+05	5	3	7	208	.289E+05
EPS MAX	5	3	1	156	.178E-02	5	3	7	210	.177E-02	5	3	5	196	.177E-02
EPS MIN	5	1	7	203	-.832E-03	5	1	7	199	-.803E-03	5	3	7	212	-.787E-03
GAMMA MAX	5	3	1	154	.252E-02	5	3	1	157	.251E-02	5	3	7	208	.247E-02

TIME IN POST = 3.897 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 16

MINIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 5

NODE	K J I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101	.948E+00	0.	.463E+00	11	30302	.123E-01	.511E+00	.463E+00
2	30103	.169E+01	0.	.463E+00	12	30201	.921E+00	.103E+00	.463E+00
3	30303	.160E+01	.663E+01	.463E+00	13	40101	.120E+01	0.	.854E+00
4	30301	.060E+00	.360E+03	.463E+00	14	40103	.102E+01	0.	.844E+00
5	50101	.154E+01	0.	.120E+01	15	40303	.165E+01	.652E+00	.830E+08
6	50103	.195E+00	0.	.120E+01	16	40301	.995E+00	.395E+00	.844E+00
7	50303	.172E+01	.640E+00	.120E+01	17	50102	.177E+01	0.	.120E+01
8	50301	.166E+01	.345E+00	.120E+01	18	50203	.192E+01	.363E+00	.120E+01
9	30102	.132E+01	0.	.463E+00	19	50302	.143E+01	.409E+00	.120E+01
10	30203	.169E+01	.336E+00	.463E+00	20	50201	.140E+01	.244E+00	.120E+01

FINE GRID ELEMENT = 1

NODE	I J K	X-COORD	Y-COORD	Z-COORD

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
2	3	1	3	.132E+01	0.	.463E+00	12	1	2	3	.935E+00	.924E-01	.463E+00
3	3	3	3	.131E+C1	.260E+0C	.463E+00	13	1	1	4	.106E+01	0.	.664F+00
4	1	3	3	.921E+00	.163E+00	.463E+00	14	3	1	4	.141E+C1	0.	.660F+00
5	1	1	5	.120E+01	0.	.854E+00	15	3	3	4	.130E+01	.270E+00	.657E+00
6	3	1	5	.151E+C1	0.	.849E+00	16	1	3	4	.102E+01	.190E+00	.660F+0C
7	3	3	5	.146E+C1	.281E+00	.845E+00	17	2	1	5	.130E+01	0.	.852E+0C
8	1	3	5	.113E+01	.213E+00	.849E+00	18	3	2	5	.150E+01	.148E+00	.847E+00
9	2	1	2	.113E+01	0.	.463E+00	19	2	3	5	.129E+01	.247E+00	.847E+00
10	3	2	3	.132E+C1	.131E+0C	.463E+00	20	1	2	5	.117E+C1	.116E+00	.852F+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.1473E-01
2	4	.3947E-02
3	4	-.2136E-01
1	1	.1519E-01
2	1	.3898E-09
3	1	-.2204E-01
1	5	.9150E-02
2	5	-.1026E-08
3	5	-.1816E-01
1	8	.9240E-02
2	8	.3908E-02
3	8	-.1756E-01
1	12	.1498E-01
2	12	.2056E-02
3	12	-.2172E-01
1	13	.1102E-01
2	13	-.6569E-09
3	13	-.2023E-01
1	20	.9158E-02
2	20	.2014E-02
3	20	-.1763E-01
1	16	.1172E-01
2	16	.3892E-02
3	16	-.1959E-01
1	2	.9539E-02
2	2	-.1842E-08
3	2	-.153CE-01
1	6	.5956E-02
2	6	-.2135E-08
3	6	-.1171E-01
1	9	.1205E-01
2	9	-.6807E-09
3	9	-.1849E-01
1	14	.7517E-02
2	14	-.1936E-08
3	14	-.1355E-01
1	17	.7336E-02
2	17	-.1849E-08
3	17	-.1467E-01
1	3	.9279E-02
2	3	.2137E-C2
3	3	-.1511E-01
1	11	.1170E-01
2	11	.2914E-C2
3	11	-.1615E-01
1	10	.9414E-02
2	10	.1106E-02
3	10	-.1518E-01

FINE GRID ELEMENT = 2

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	1	1	5	.120E+01	0.	.854E+00	11	2	3	5	.129E+01	.247E+00	.847E+00
2	3	1	5	.151E+C1	0.	.849E+00	12	1	2	5	.117E+C1	.116E+00	.852E+00
3	3	3	5	.146E+01	.281E+00	.845E+00	13	1	1	5	.130E+01	.116E+00	.847E+01

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J	I	J	J	+ANGLE+A	+COORD+U	+ANGLE+UU	AJ	I	A	K	+ANGLE+A	UU	+ANGLE+UA
4	1	3	5	.113E+01	.213E+00	.849E+00	13	3	1	6	.163E+01	U.	.103E+01
5	1	1	7	.154E+01	0.	.120E+01	15	3	3	6	.155E+01	.291E+00	.103E+01
6	3	1	7	.177E+01	0.	.120E+01	16	1	3	6	.126E+01	.229E+30	.103E+01
7	3	3	7	.166E+01	.302E+00	.120E+01	17	2	1	7	.166E+01	0.	.120E+01
8	1	3	7	.140E+01	.244E+00	.120E+01	18	3	2	7	.173E+01	.165E+00	.120E+01
9	2	1	5	.136E+01	V.	.852E+00	19	2	3	7	.153E+01	.272E+00	.120E+01
10	3	2	5	.150E+01	.146E+00	.847E+00	20	1	2	7	.140E+01	.140E+00	.120E+01

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.9240E-02
2	4	.3900E-02
3	4	-.1756E-01
1	1	.9150E-02
2	1	-.1026E-00
3	1	-.1810E-01
1	5	.5096E-02
2	5	.2074E-09
3	5	-.1288E-01
1	8	.5079E-02
2	8	.4150E-02
3	8	-.1270E-01
1	12	.9158E-02
2	12	.2014E-02
3	12	-.1703E-01
1	13	.7174E-02
2	13	-.7181E-09
3	13	-.1969E-01
1	20	.5790E-02
2	20	.2111E-02
3	20	-.1277E-01
1	16	.7292E-02
2	16	.3994E-02
3	16	-.1926E-01
1	2	.5956E-02
2	2	-.2135E-08
3	2	-.1171E-01
1	6	.4214E-02
2	6	-.4505E-09
3	6	-.7780E-02
1	9	.7336E-02
2	9	-.1849E-08
3	9	-.1467E-01
1	14	.4855E-02
2	14	-.1640E-08
3	14	-.9790E-02
1	17	.4940E-02
2	17	-.2740E-09
3	17	-.1004E-01
1	7	.4882E-02
2	7	.1813E-02
3	7	-.8925E-02
1	18	.4474E-02
2	18	.8672E-03
3	18	-.8284E-02
1	19	.5378E-02
2	19	.2816E-02
3	19	-.1077E-01

FINE GRID ELEMENT = 3

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	1	3	3	.921E+00	.183E+00	.463E+00	11	2	5	3	.105E+01	.435E+00	.463E+00
2	3	3	3	.131E+01	.260E+00	.463E+00	12	1	4	3	.899E+00	.272E+00	.463E+00
3	1	5	3	.123E+01	.511E+00	.463E+00	13	1	3	4	.102E+01	.198E+00	.660E+00
4	1	5	3	.866E+00	.360E+00	.463E+00	14	3	3	4	.136E+01	.270E+00	.657E+00
5				.117E+04	.717E+00	.810E+00	15				.127E+04	.505E+00	.657E+00

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6	3	3	5	.146E+01	.241E+00	.845E+00	16	1	5	4	.926E+00	.356E+00	.656E+00
7	3	5	5	.132E+01	.500E+00	.841E+00	17	2	3	5	.129E+01	.247E+00	.847E+00
8	1	5	5	.995E+00	.352E+00	.844E+00	18	3	4	5	.140E+01	.398E+00	.843E+00
9	2	3	3	.111E+01	.221E+00	.463E+00	19	2	5	5	.116E+01	.426E+00	.842E+00
10	3	4	3	.128E+01	.386E+00	.463E+00	20	1	4	5	.107E+01	.292E+00	.846E+00

POINT, CLAMP, AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.1411E-01
2	4	.7230E-02
3	4	-.2051E-01
1	1	.1473E-01
2	1	.3947E-02
3	1	-.2136E-01
1	5	.9240E-02
2	5	.3908E-02
3	5	-.1756E-01
1	8	.9629E-02
2	8	.7339E-02
3	8	-.1701E-01
1	12	.1444E-01
2	12	.5671E-02
3	12	-.2096E-01
1	13	.1172E-01
2	13	.3892E-02
3	13	-.1959E-01
1	20	.9397E-02
2	20	.5603E-02
3	20	-.1729E-01
1	16	.1160E-01
2	16	.7214E-02
3	16	-.1887E-01
1	3	.8976E-02
2	3	.3978E-02
3	3	-.1510E-01
1	7	.7101E-02
2	7	.3642E-02
3	7	-.1303E-01
1	11	.1124E-01
2	11	.5349E-02
3	11	-.1786E-01
1	19	.8272E-02
2	19	.5198E-02
3	19	-.1512E-01
1	15	.7924E-02
2	15	.3731E-02
3	15	-.1411E-01
1	2	.9279E-02
2	2	.2137E-02
3	2	-.1511E-01
1	10	.9133E-02
2	10	.3095E-02
3	10	-.1508E-01
1	9	.1170E-01
2	9	.2914E-02
3	9	-.1815E-01

FINE GRID ELEMENT = 4

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	1	3	5	.113E+01	.213E+00	.849E+00	11	2	5	5	.116E+01	.426E+00	.942E+00
2	3	3	5	.146E+01	.241E+00	.845E+00	12	1	4	5	.107E+01	.292E+00	.846E+00
3	3	5	5	.132E+01	.500E+00	.841E+00	13	1	3	6	.126E+01	.229E+00	.103E+01
4	1	5	5	.995E+00	.352E+00	.844E+00	14	3	3	6	.155E+01	.291E+00	.103E+01
5	1	3	7	.140E+01	.244E+00	.120E+01	15	3	5	6	.137E+01	.495E+00	.102E+01
6	3	3	7	.166E+01	.302E+00	.120E+01	16	1	5	6	.107E+01	.348E+00	.103E+01
7	3	5	7										

	J	J	I							J	I			
8	1	5	7	.116E+01	.345E+00	.128E+01	18	3	4	7	.156E+01	.410E+00	.128E+01
9	2	3	5	.129E+01	.247E+00	.847E+00	19	2	5	7	.130E+01	.416E+00	.128E+01
10	3	4	5	.140E+01	.390E+00	.843E+00	20	1	4	7	.129E+01	.312E+00	.128E+01

POINT ,CLAMP, AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.9629E-02
2	4	.7339E-02
3	4	-.1701E-01
1	1	.9200E-02
2	1	.3988E-02
3	1	-.1796E-01
1	5	.5075E-02
2	5	.4150E-02
3	5	-.1270E-01
1	8	.8022E-02
2	8	.8009E-02
3	8	-.1267E-01
1	12	.9397E-02
2	12	.5603E-02
3	12	-.1729E-01
1	13	.7292E-02
2	13	.3994E-02
3	13	-.1526E-01
1	20	.6153E-02
2	20	.6116E-02
3	20	-.1267E-01
1	16	.7941E-02
2	16	.7604E-02
3	16	-.1494E-01
1	3	.7101E-02
2	3	.3642E-02
3	3	-.1303E-01
1	7	.6145E-02
2	7	.3939E-02
3	7	-.1062E-01
1	11	.8272E-02
2	11	.5198E-02
3	11	-.1512E-01
1	19	.6497E-02
2	19	.5644E-02
3	19	-.1185E-01
1	15	.6508E-02
2	15	.3711E-02
3	15	-.1107E-01
1	6	.4882E-02
2	6	.1813E-02
3	6	-.8925E-02
1	18	.5446E-02
2	18	.2837E-02
3	18	-.9703E-02
1	17	.5370E-02
2	17	.2816E-02
3	17	-.1077E-01

FINE GRID ELEMENT = 5

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	1	3	.132E+01	0.	.463E+00	11	4	3	3	.150E+01	.290E+00	.463E+00
2	5	1	3	.169E+01	0.	.463E+00	12	3	2	3	.132E+01	.131E+00	.463E+00
3	5	3	3	.169E+01	.336E+00	.463E+00	13	3	1	4	.141E+01	0.	.660E+00
4	3	3	3	.131E+01	.260E+00	.463E+00	14	5	1	4	.175E+01	0.	.656E+00
5	3	1	5	.151E+01	0.	.849E+00	15	5	3	4	.173E+01	.343E+00	.654E+00
6	5	1	5	.182E+01	0.	.844E+00	16	3	3	4	.139E+01	.270E+00	.697E+00
7	5	3	5	.179E+01	.350E+00	.841E+00	17	4	1	5	.167E+01	0.	.846E+00
8	3	3	5	.146E+01	.291E+00	.845E+00	18	5	2	5	.182E+01	.181E+00	.842E+00

```
  7   4   1   5   .1J1EFU4   U.   .46JEFUU   .403EFUU   17   4   J   2   .400EFU4   .JA3EFUU   .04JEFUU
 10   5   2   3   .170E+C1   .165E+CG   .463E+00   2C   3   2   5   .153E+U1   .148E+0U   .847E+CU
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POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.6440E-02
2	2	.3610E-09
3	2	-.9979E-02
1	3	.6290E-02
2	3	.1348E-02
3	3	-.9613E-02
1	7	.4781E-02
2	7	.8945E-03
3	7	-.7363E-02
1	6	.4497E-02
2	6	-.1097E-08
3	6	-.7208E-02
1	10	.6350E-02
2	10	.6653E-03
3	10	-.9734E-02
1	15	.5461E-02
2	15	.1077E-02
3	15	-.8444E-02
1	18	.4607E-02
2	18	.3855E-03
3	18	-.7195E-02
1	14	.5356E-02
2	14	-.7236E-09
3	14	-.8521E-02
1	1	.9539E-02
2	1	-.1042E-08
3	1	-.1530E-01
1	5	.5956E-02
2	5	-.2135E-08
3	5	-.1171E-01
1	9	.7670E-02
2	9	-.6948E-09
3	9	-.1246E-01
1	17	.5010E-02
2	17	-.1885E-08
3	17	-.9225E-02
1	13	.7517E-02
2	13	-.193GE-08
3	13	-.1355E-01
1	4	.9279E-02
2	4	.2137E-02
3	4	-.1511E-01
1	12	.9414E-02
2	12	.1106E-02
3	12	-.1518E-01
1	11	.7479E-02
2	11	.1615E-02
3	11	-.1227E-01

FINE GRID ELEMENT = 6

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	1	5	.151E+C1	0.	.849E+00	11	4	3	5	.162E+C1	.315E+00	.943E+00
2	5	1	5	.182E+C1	0.	.844E+00	12	3	2	5	.157E+01	.148E+00	.947F+00
3	5	3	5	.179E+C1	.350E+00	.841E+00	13	3	1	6	.163E+01	0.	.193E+01
4	3	3	5	.146E+C1	.281E+00	.845E+00	14	5	1	6	.190E+01	0.	.103E+01
5	3	1	7	.177E+C1	0.	.120E+01	15	5	3	6	.185E+01	.357E+00	.102F+01
6	5	1	7	.199E+C1	C.	.120E+01	16	3	3	6	.155E+01	.291E+00	.103E+01
7	5	3	7	.192E+C1	.363E+00	.120E+01	17	4	1	7	.186E+C1	0.	.120E+01
8	3	3	7	.166E+C1	.302E+00	.120E+01	18	5	2	7	.197E+01	.192E+00	.120E+01
9	4	1	5	.167E+C1	0.	.846E+00	19	4	3	7	.173E+C1	.332E+00	.120F+01
10	5	2	5	.182E+U1	.181E+00	.842E+00	20	3	2	7	.173E+C1	.165E+00	.120E+C1
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POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.4497E-02
2	2	-.1097E-08
3	2	-.7208E-02
1	3	.4781E-02
2	3	.6945E-03
3	3	-.7363E-02
1	7	.3895E-02
2	7	.7938E-03
3	7	-.5469E-02
1	6	.3448E-02
2	6	.2910E-09
3	6	-.5814E-02
1	10	.4607E-02
2	10	.3895E-03
3	10	-.7195E-02
1	15	.4259E-02
2	15	.6000E-03
3	15	-.6372E-02
1	18	.3619E-02
2	18	.2022E-03
3	18	-.5122E-02
1	14	.3061E-02
2	14	-.7589E-09
3	14	-.6038E-02
1	1	.5956E-02
2	1	-.2139E-08
3	1	-.1171E-01
1	5	.4214E-02
2	5	-.4505E-09
3	5	-.7780E-02
1	9	.5010E-02
2	9	-.1805E-08
3	9	-.9225E-02
1	17	.3717E-02
2	17	-.2622E-09
3	17	-.6105E-02
1	13	.4855E-02
2	13	-.1640E-08
3	13	-.9790E-02
1	8	.4002E-02
2	8	.1813E-02
3	8	-.6925E-02
1	19	.4388E-02
2	19	.1138E-02
3	19	-.7157E-02
1	20	.4474E-02
2	20	.6672E-03
3	20	-.8284E-02

FINE GRID ELEMENT = 7

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	3	3	.131E+01	.260E+00	.463E+00	11	4	5	3	.142E+01	.587E+00	.463E+00
2	5	3	3	.169E+01	.336E+00	.463E+00	12	3	4	3	.128E+01	.386E+00	.463E+00
3	5	5	3	.160E+01	.663E+00	.463E+00	13	3	3	4	.138E+01	.270E+00	.657E+00
4	3	5	3	.123E+01	.511E+00	.463E+00	14	5	3	4	.173E+01	.343E+00	.654E+00
5	3	3	5	.146E+01	.281E+00	.845E+00	15	5	5	4	.162E+01	.657E+00	.652E+00
6	5	3	5	.179E+01	.350E+00	.841E+00	16	3	5	4	.127E+01	.506E+00	.654E+00
7	5	5	5	.165E+01	.652E+00	.838E+00	17	4	3	5	.162E+01	.315E+00	.843E+00
8	3	5	5	.132E+01	.500E+00	.841E+00	18	5	4	5	.173E+01	.507E+00	.849E+00
9	4	3	3	.150E+01	.296E+00	.463E+00	19	4	5	5	.149E+01	.576E+00	.846E+00
10	5	4	3	.166E+01	.500E+00	.463E+00	20	3	4	5	.140E+01	.398E+00	.843E+00

POINT,CLAMP,AND SLOPE TYPE BC.
TYPE   NODE   VALUE

TYPE	NODE	VALUE
1	2	.6298E-02
2	2	.1346E-02
3	2	-.9613E-02
1	3	.6244E-02
2	3	.2767E-02
3	3	-.9745E-02
1	7	.5320E-02
2	7	.2263E-02
3	7	-.8244E-02
1	6	.4781E-02
2	6	.8945E-03
3	6	-.7363E-02
1	10	.6260E-02
2	10	.2049E-02
3	10	-.9617E-02
1	15	.9736E-02
2	15	.2437E-02
3	15	-.8978E-02
1	18	.5819E-02
2	18	.1527E-02
3	18	-.7713E-02
1	14	.5461E-02
2	14	.1077E-02
3	14	-.6444E-02
1	4	.8976E-02
2	4	.3976E-02
3	4	-.1510E-01
1	8	.7101E-02
2	8	.3642E-02
3	8	-.1303E-01
1	11	.7310E-02
2	11	.3118E-02
3	11	-.1241E-01
1	16	.7924E-02
2	16	.3731E-02
3	16	-.1411E-01
1	19	.6117E-02
2	19	.2678E-02
3	19	-.1074E-01
1	1	.9279E-02
2	1	.2137E-02
3	1	-.1511E-01
1	12	.9133E-02
2	12	.3895E-02
3	12	-.1508E-01
1	9	.7479E-02
2	9	.1615E-02
3	9	-.1227E-01

FINE GRID ELEMENT = 8

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	3	5	.146E+01	.291E+00	.845E+00	11	4	5	5	.148E+01	.576E+00	.849E+00
2	5	3	5	.179E+01	.350E+00	.841E+00	12	3	4	5	.145E+01	.398E+00	.843E+00
3	5	5	5	.165E+01	.652E+00	.838E+00	13	3	3	6	.155E+01	.291E+00	.103E+01
4	3	5	5	.132E+01	.500E+00	.841E+00	14	5	3	6	.185E+01	.357E+00	.102E+01
5	3	3	7	.166E+01	.302E+00	.120E+01	15	5	5	6	.168E+01	.646E+00	.102E+01
6	5	3	7	.192E+01	.363E+00	.120E+01	16	3	5	6	.137E+01	.495E+00	.102E+01
7	5	5	7	.172E+01	.640E+00	.120E+01	17	4	3	7	.179E+01	.332E+00	.120E+01
8	3	5	7	.143E+01	.489E+00	.120E+01	18	5	4	7	.183E+01	.513E+00	.120E+01
9	4	3	5	.162E+01	.315E+00	.843E+00	19	4	5	7	.157E+01	.564E+00	.120E+01
10	5	4	5	.173E+01	.507E+00	.840E+00	20	3	4	7	.156E+01	.410E+00	.120E+01

POINT, CLAMP, AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.4781E-02
2	2	.89LEE-07

3	2	-.7363E-02
1	3	.9320E-02
2	3	.2203E-02
3	3	-.8244E-02
1	7	.4763E-02
2	7	.2905E-02
3	7	-.6070E-02
1	6	.3895E-02
2	6	.7930E-03
3	6	-.9609E-02
1	10	.5019E-02
2	10	.1927E-02
3	10	-.7713E-02
1	15	.4995E-02
2	15	.2306E-02
3	15	-.7944E-02
1	18	.4276E-02
2	18	.1939E-02
3	18	-.6054E-02
1	14	.4259E-02
2	14	.8000E-03
3	14	-.6372E-02
1	4	.7101E-02
2	4	.3642E-02
3	4	-.1303E-01
1	8	.6145E-02
2	8	.3939E-02
3	8	-.1062E-01
1	11	.6117E-02
2	11	.2670E-02
3	11	-.1074E-01
1	16	.6500E-02
2	16	.3711E-02
3	16	-.1107E-01
1	19	.5567E-02
2	19	.2893E-02
3	19	-.8959E-02
1	5	.4802E-02
2	5	.1813E-02
3	9	-.8929E-02
1	20	.5440E-02
2	20	.2837E-02
3	20	-.9703E-02
1	17	.4380E-02
2	17	.1138E-02
3	17	-.7197E-02

TIME IN REZONE   =   1.281 SECONDS

TIME IN FORMKF   =   3.690 SECONDS

TIME IN PREFRONT =   .309

TOTAL NUMBER OF D.O.F.S =   270

D.O.F. IN FRONT = 112

MAXIMUM ACTIVE STORAGE =   8966

TOTAL NICKNAME STORAGE =   224

BUFFER LENGTH = 18033

TIME IN FORWARD ELIMINATION =   7.523

NUMBER OF SECTORS(DBUS) =   281

64

NUMBER OF SECTORS(FNO3) = 281

TIME IN BACKSUBSTITUTION = .659

TIME IN ZIPP   =   8.494 SECONDS

65

BLOCK   OPTION

BOUNDS

	MIN	MAX		MIN	MAX
X	-.1000E+21	.1000E+21	I	0	0
Y	-.1000E+21	.1000E+21	J	0	0
Z	-.1000E+21	.1000E+21	K	0	0

PRINT LEVEL = 4

STRESS POINTS FOR BRICK(DEGEN) ELEMENTS

POINT	S1	S2	S3
1	-1.000	-1.000	-1.000
2	1.000	-1.000	-1.000
3	1.000	1.000	-1.000
4	-1.000	1.000	-1.000
5	-1.000	-1.000	1.000
6	1.000	-1.000	1.000
7	1.000	1.000	1.000
8	-1.000	1.000	1.000
9	0.000	0.000	0.000

STRESS POINTS FOR PRISM ELEMENTS

POINT	S1	S2	S3	S4
1	1.000	0.000	0.000	-1.000
2	0.000	1.000	0.000	-1.000
3	0.000	0.000	1.000	-1.000
4	1.000	0.000	0.000	1.000
5	0.000	1.000	0.000	1.000
6	0.000	0.000	1.000	1.000
7	.333	.333	.333	0.000

STRESS POINTS FOR WEDGE ELEMENTS

POINT	S1	S2	S3
1	.050	0.000	-1.000
2	1.000	0.000	-1.000
3	1.000	1.000	-1.000
4	.050	0.000	1.000
5	1.000	0.000	1.000
6	1.000	1.000	1.000
7	.667	.500	0.000

STRESS POINTS FOR TETRA ELEMENTS

POINT	S1	S2	S3	S4
1	1.000	0.000	0.000	0.000
2	0.000	1.000	0.000	0.000
3	0.000	0.000	1.000	0.000
4	0.000	0.000	0.000	1.000
5	.250	.250	.250	.250

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DISPLACEMENTS FOR BRICKH ELEMENT NO.    1 MATERIAL =  1

   I    J    K          U             V             W             H

   1    1    3     .1519E-01     .3898E-09    -.2204E-01     .1106E+00
   3    1    3     .9539E-02    -.1042E-08    -.1530E-01    -.1437E+01
   3    3    3     .9279E-02     .2137E-02    -.1511E-01     .9537E-01
   1    3    3     .1473E-01     .3947E-02    -.2136E-01     .1359E+01
   1    1    5     .9150E-02    -.1025E-08    -.1810E-01     .1505E+01
   3    1    5     .5956E-02    -.2135E-08    -.1171E-01     .2160E+00
   3    3    5     .6460E-02     .1518E-02    -.1195E-01     .2179E+00
   1    3    5     .9240E-02     .3900E-02    -.1756E-01    -.1258E+01
   2    1    3     .1205E-01    -.6807E-09    -.1849E-01
   3    2    3     .9414E-02     .1106E-02    -.1518E-01
   2    3    3     .1170E-01     .2914E-02    -.1815E-01
   1    2    3     .1498E-01     .2056E-02    -.2172E-01
   1    1    4     .1182E-01    -.6569E-09    -.2023E-01
   3    1    4     .7517E-02    -.1936E-08    -.1355E-01
   3    3    4     .7889E-02     .2431E-02    -.1300E-01
   1    3    4     .1172E-01     .3892E-02    -.1959E-01
   2    1    5     .7336E-02    -.1849E-08    -.1467E-01
   3    2    5     .6628E-02     .9415E-03    -.1313E-01
   2    3    5     .6721E-02     .2720E-02    -.1466E-01
   1    2    5     .9150E-02     .2014E-02    -.1783E-01

STRESSES FOR BRICKH ELEMENT NO.    1 MATERIAL =  1

POINT        X         Y          Z     SIGMAX    SIGMAY    SIGMAZ    TAUXY     TAUYZ     TAUZX     SIGMA1    SIGMA2    SIGMA3    TAUMAX
                                        EPSX      EPSY      EPSZ      GAMMAXY   GAMMAYZ   GAMMAZX   EPS1      EPS2      EPS3      GAMMAMAX
    1   .94E+00   0.        .46E+00   .47E+03   .99E+03   .67E+03  -.14E+02   .21E+02   .74E+02   .99E+03   .69E+03   .44E+03   .28E+03
                                     -.18E-01   .23E-01  -.26E-02  -.22E-02   .34E-02   .12E-01   .23E-01  -.76E-03  -.20E-01   .43E-01
    2   .13E+01   0.        .46E+00  -.92E+04  -.90E+04  -.91E+04  -.68E+00  -.65E+00   .61E+02  -.90E+04  -.90E+04  -.93E+04   .14E+03
                                     -.12E-01   .87E-02   .19E-02  -.11E-03  -.10E-03   .96E-02   .87E-02   .34E-02  -.13E-01   .22E-01
    3   .13E+01   .26E+00   .46E+00   .47E+03   .69E+03   .71E+03  -.48E+02   .54E+02   .72E+02   .76E+03   .68E+03   .44E+03   .16E+03
                                     -.10E-01   .70E-02   .85E-02  -.76E-02   .85E-02   .11E-01   .12E-01   .60E-02  -.13E-01   .25E-01
    4   .92E+00   .18E+00   .46E+00   .84E+04   .80E+04   .86E+04  -.10E+03   .63E+02   .45E+02   .89E+04   .86E+04   .84E+04   .29E+03
                                     -.16E-01   .18E-01   .53E-03  -.16E-01   .99E-02   .72E-02   .21E-01   .78E-03  -.19E-01   .40E-01
    5   .12E+01   0.        .85E+00   .94E+04   .97E+04   .94E+04  -.14E+02   .35E+02   .14E+03   .97E+04   .95E+04   .93E+04   .24E+03
                                     -.13E-01   .17E-01  -.67E-02  -.22E-02   .55E-02   .21E-01   .17E-01   .12E-02  -.21E-01   .38E-01
    6   .15E+01   0.        .85E+00   .13E+04   .15E+04   .14E+04   .42E+02  -.11E+03   .94E+02   .15E+04   .14E+04   .12E+04   .17E+03
                                     -.75E-02   .72E-02  -.51E-03   .67E-02  -.17E-01   .15E-01   .13E-01   .14E-02  -.15E-01   .27E-01
    7   .15E+01   .26E+00   .84E+00   .15E+04   .14E+04   .13E+04  -.64E+02   .12E+03   .30E+01   .15E+04   .14E+04   .12E+04   .15E+03
                                      .57E-02   .17E-03  -.38E-02  -.10E-01   .19E-01   .47E-03   .11E-01   .34E-02  -.12E-01   .23E-01
    8   .11E+01   .21E+00   .85E+00  -.82E+04  -.78E+04  -.80E+04  -.13E+03   .12E+03   .11E+03  -.77E+04  -.79E+04  -.83E+04   .30E+03
                                     -.20E-01   .15E-01   .37E-03  -.21E-01   .18E-01   .18E-01   .20E-01   .25E-02  -.28E-01   .48E-01
    9   .12E+01   .12E+00   .66E+00   .51E+03   .80E+03   .62E+03  -.40E+02   .36E+02   .65E+02   .81E+03   .65E+03   .47E+03   .17E+03
                                     -.11E-01   .13E-01  -.13E-02  -.63E-02   .56E-02   .18E-01   .13E-01   .82E-03  -.14E-01   .27E-01
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DISPLACEMENTS FOR BRICKM ELEMENT NO. 2 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKM ELEMENT NO. 2 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
10													
11													
12													
13													
14													
15													
16													
17													
18													

DISPLACEMENTS FOR BRICK ELEMENT NO. 3 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICK ELEMENT NO. 3 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
19													
20													
21													
22													
23													
24													
25													
26													
27													

DISPLACEMENTS FOR BRICKH ELEMENT NO. 6 MATERIAL = 1

I	J	K	U	V	W	X	Y	Z

STRESSES FOR BRICKH ELEMENT NO. 6 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICKM ELEMENT NO.   E MATERIAL = 1

I	J	K	U	V	W	H
3	3	3	.9539E-02	.1042E-08	-.1530E-01	-.1437E+01
5	3	3	.6460E-02	.3610E-09	-.9979E-02	.1020E+01
3	4	3	.6298E-02	.1368E-02	.9613E-02	.2491E+00
5	4	3	.9279E-02	.2137E-02	.1511E-01	.9537E-01
3	5	3	.5966E-02	-.2135E-08	-.1171E-01	.2160E+00
5	5	3	.4497E-02	-.1097E-08	-.7206E-02	-.7170E-01
3	1	5	.4781E-02	.894SE-03	-.7363E-02	-.5364E+00
5	1	5	.6460E-02	-.1910E-02	-.1199E-01	.2179E+00
3	2	5	.7670E-02	-.6940E-09	-.1246E-01	
5	2	5	.6358E-02	.6653E-03	.9734E-02	
3	3	5	.7479E-02	.1615E-02	-.1227E-01	
5	3	5	.9414E-02	.1106E-02	-.1510E-01	
3	4	5	.7517E-02	-.193GE-08	-.1355E-01	
5	4	5	.5356E-02	-.7235E-09	-.5521E-02	
3	5	5	.7009E-02	.1077E-02	.8444E-02	
5	5	5	.5010E-02	.2431E-02	-.1300E-01	
3	1	5	.4607E-02	-.1005E-08	-.9225E-02	
5	2	5	.4961E-02	.3955E+03	-.7195E-02	
3	2	5	.6604E-02	.9415E-03	.1313E-01	

STRESSES FOR BRICKM ELEMENT NO.   5 MATERIAL = 1

PGINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
17	.13E+01	0.	.46E+00	-.92E+04 -.12E-01	.90E+04 .87E-02	.94E+04 .19E-02	.66E+02 -.11E-03	.65E+00 -.10E-03	.61E+02 .96E-02	.90E+04 .07E-02	-.90E+04 .34E-02	-.93E+04 -.93E+04	.14E+03 .22E-01
38	.17E+01	0.	.46E+00	-.12E-01 -.11E+05	.12E+05	.12E+05 -.19E-02	-.17E-01	-.10E-03	-.47E-02	.12E+05	.12E+05	-.13E-01 -.11E+05	.75E+02
39	.17E+01	.34E+00	.46E+00	-.6SE-02 .15E+04	.39E-02 .16E+04	.44E-02 -.16E+04	-.20E-05 .15E+02	.27E-01 .43E-03	.75E-02 .58E+02	.57E-02 .16E+04	.30E-02 .12E+05	-.62E-02 -.11E+05	.12E+01 .77E+02
40	.13E+01	.26E+00	.46E+00	-.44E-02 .47E+03	.40E-02 .69E+03	.34E-02 .71E+03	-.24E-02 .90E+02	.72E-03 .45E+01	.91E-02 .72E+02	.55E-02 .76E+03	.11E-02 .66E+03	-.66E-02 .44E+03	.12E-01 .77E+02
41	.15E+01	0.	.05E+00	-.13E-01 .13E+04	.70E-02 .15E+04	.65E-02 -.14E+04	-.76E-02 .90E+02	.85E-02 .5E+02	.11E-01 .94E+02	.12E-01 .76E+03	.60E-02 .11E+04	-.13E-01 .29E-01	.29E-01 .17E+03
42	.18E+01	0.	.84E+00	-.75E-02 .43E+03	.72E-02 .48E+03	.51E-02 .48E+03	.42E-02 .30E+01	-.11E-03 .01E+00	-.02E-02 .52E+03	.15E-01 .13E-01	.11E-02 .40E+03	-.12E-01 .35E-01	.17E-01 .27E-01
43	.16E+01	.35E+00	.84E+00	-.20E-02 .34E+04	.17E-02 .34E+04	.20E-02 -.34E+04	.47E-03 -.66E+02	-.13E-03 .39E+02	.02E+02 .19E+03	.46E-02 .33E+04	.40E+03 .40E+03	-.45E-02 .92E-02	.92E-02 .19E-01
44	.15E+01	.20E+00	.04E+00	.24E+02 -.11E-02	.11E-02 -.16E+04	-.87E-03 -.1E-04	-.72E-02 -.32E+02	.60E-02 .64E+02	.17E-01 .55E+04	.93E-02 .15E+04	.29E-02 .13E+04	-.96E-02 -.12E-01	.13E+03 .20E-01
45	.16E+01	.16E+00	.66E+00	.47E+03 .62E-02	.46E-04 .63E+03	.56E-03 .00E-03	-.50E-02 -.22E+02	.10E-01 .13E+02	.97E-04 .75E+02	.82E-02 .64E+05	-.26E-02 .59E+03	-.12E-01 .02E+03	.20E-01 .11E-01

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DISPLACEMENTS FOR BRICKH ELEMENT NO. 6 MATERIAL = 1

I	J	K	U	V	W	M

STRESSES FOR BRICKH ELEMENT NO. 6 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

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DISPLACEMENTS FOR BRICKM ELEMENT NO. 7 MATERIAL = 1

I	J	K	U	V	W	M	M	M

STRESSES FOR BRICKM ELEMENT NO. 7 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICK ELEMENT NO. 8 MATERIAL = 1

I	J	K	U	V	W	M	N

STRESSES FOR BRICK ELEMENT NO. 8 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
64													
65													
66													
67													
68													
69													
70													
71													
72													

ELEMENT SUMMARY PEPOPT

THREE MOST HIGHLY STRESSED ELEMENTS

	----FIRST----			----SECOND----			----THIRD----		
ELEMENT	POINT	STRESS	ELEMENT	POINT	STRESS	ELEMENT	POINT	STRESS
I J K	NO.		I J K	NO.		I J K	NO.	

MATERIAL NUMBER = 1

	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS
SIGMA MAX	1	1	5	17	.160E+05	1	3	5	32	.160E+05	3	1	3	36	.116E+05
SIGMA MIN	1	1	5	14	-.236E+05	3	1	3	37	-.926E+04	1	1	3	2	-.926E+04
TAU MAX	1	1	3	8	.303E+03	1	3	5	26	.303E+03	1	1	5	13	.303E+03
EPS MAX	1	1	3	1	.231E-01	1	1	3	4	.208E-01	1	3	3	19	.208E-01
EPS MIN	1	1	5	14	-.292E-01	1	1	5	13	-.276E-01	1	1	3	8	-.276E-01
GAMMA MAX	1	1	5	13	.478E-01	1	1	3	8	.478E-01	1	3	5	26	.478E-01

TIME IN POST = 1.116 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 16

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 1

NODE	K	J	I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101			.940E+00	0.	.463E+00	11	30302	.111E+01	.221E+00	.463E+00
2	30303			.132E+01	0.	.463E+00	12	30201	.935E+00	.924E-01	.467E+00
3	30303			.131E+01	.260E+00	.463E+00	13	40101	.106E+01	0.	.664E+00
4	30301			.921E+00	.181E+00	.463E+00	14	40103	.141E+01	0.	.660E+00
5	50101			.120E+01	0.	.654E+00	15	40303	.136E+01	.270E+00	.657E+00
6	50103			.151E+01	0.	.649E+00	16	40301	.102E+01	.190E+00	.660E+00
7	50303			.146E+01	.201E+00	.653E+00	17	50102	.136E+01	0.	.652E+00
8	50301			.113E+01	.213E+00	.653E+00	18	50203	.156E+01	.440E+00	.847E+00
9	30102			.113E+01	0.	.463E+00	19	50302	.129E+01	.247E+00	.847E+00
10	30203			.132E+01	.131E+00	.463E+00	20	50201	.117E+01	.116E+00	.652E+00

FINE GRID ELEMENT = 1

NODE	K	J	I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	1	1	1	.940E+00	0.	.463E+00	11	3 2 3	.103E+01	.100E+00	.463E+00
2	3	1	1	.113E+01	.112E+00	.463E+00	12	1 2 1	.938E+00	.464E-01	.463E+00
3	3	3	1	.113E+01	.926E-01	.463E+00	13	1 1 4	.999E+00	0.	.565E+00
4	1	3	1	.935E+00	0.	.463E+00	14	3 1 4	.118E+01	0.	.564E+00
5	1	1	5	.106E+01	0.	.662E+00	15	3 3 4	.117E+01	.117E+00	.563E+00
6	3	1	5	.123E+01	.122E+00	.662E+00	16	1 3 4	.988E+00	.903E-01	.564E+00
7	3	3	5	.122E+01	.114E+00	.662E+00	17	1 1 2	.116E+01	0.	.663E+00
8	1	3	5	.105E+01	0.	.463E+00	18	3 2 5	.123E+01	.621E-01	.661E+00
9	1	1	3	.103E+01	0.	.463E+00	19	3 3 5	.113E+01	.113E+00	.661E+00
10	3	2	3	.113E+01	.560E-01	.463E+00	20	1 2 5	.105E+01	.534E-01	.663E+00

POINT CLAMP AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.1490E-01
2	2	.2055E-02

75

		.2030E-01
3	4	-.2172E-01
1	1	.1519E-01
2	1	.3098E-09
3	1	-.2204E-01
1	5	.1182E-01
2	5	-.6569E-09
3	5	-.2023E-01
1	8	.1176E-01
2	8	.2017E-02
3	8	-.1992E-01
1	12	.1509E-01
2	12	.1049E-02
3	12	-.2189E-01
1	13	.1342E-01
2	13	-.2183E-09
3	13	-.2118E-01
1	20	.1179E-01
2	20	.1026E-02
3	20	-.2008E-01
1	16	.1330E-01
2	16	.2032E-02
3	16	-.2088E-01
1	2	.1205E-01
2	2	-.6807E-09
3	2	-.1849E-01
1	6	.9402E-02
2	6	-.1608E-08
3	6	-.1668E-01
1	9	.1354E-01
2	9	-.2341E-09
3	9	-.2022E-01
1	14	.1065E-01
2	14	-.1230E-08
3	14	-.1701E-01
1	17	.1055E-01
2	17	-.1210E-08
3	17	-.1841E-01
1	3	.1188E-01
2	3	.1517E-02
3	3	-.1852E-01
1	11	.1336E-01
2	11	.1771E-02
3	11	-.1999E-01
1	10	.1197E-01
2	10	.7736E-03
3	10	-.1841E-01

FINE GRID ELEMENT = 2

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	1	1	5	.106E+01	0.	.664E+00	11	2	3	5	.113E+01	.113E+00	.661E+00
2	3	1	5	.123E+01	0.	.662E+00	12	1	2	5	.105E+01	.534E-01	.663F+00
3	3	3	5	.122E+01	.122E+00	.660E+00	13	1	1	6	.113E+01	0.	.760E+00
4	1	3	5	.105E+01	.104E+00	.662E+00	14	3	1	6	.129E+01	0.	.758E+00
5	1	1	7	.120E+01	0.	.854E+00	15	3	3	6	.128E+01	.127E+00	.756E+00
6	3	1	7	.136E+01	0.	.852E+00	16	1	3	6	.111E+01	.110E+00	.758E+00
7	3	3	7	.133E+01	.112E+00	.849E+00	17	2	1	7	.128E+01	0.	.853E+00
8	1	3	7	.117E+01	.116E+00	.852E+00	18	3	2	7	.135E+01	.681E-01	.850E+00
9	2	1	5	.115E+01	0.	.663E+00	19	2	3	7	.125E+01	.124E+00	.850F+00
10	3	2	5	.123E+01	.621E-01	.661E+00	20	1	2	7	.119E+01	.604E-01	.853E+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.1176E-01
2	4	.2017E-02
3	4	-.1992E-01
.	.	.1127E-01

		.xxxxE-xx
2	1	-.6569E-09
3	1	-.2023E-01
1	5	.9150E-02
2	5	-.1026E-08
3	5	-.1810E-01
1	8	.9190E-02
2	8	.2014E-02
3	8	-.1703E-01
1	12	.1179E-01
2	12	.1020E-02
3	12	-.2008E-01
1	13	.1040E-01
2	13	.9262E-09
3	13	-.1921E-01
1	20	.9145E-02
2	20	.1022E-02
3	20	-.1797E-01
1	16	.1038E-01
2	16	.2011E-02
3	16	-.1891E-01
1	2	.9402E-02
2	2	-.1606E-08
3	2	-.1668E-01
1	6	.7336E-02
2	6	-.1849E-08
3	6	-.1467E-01
1	9	.1055E-01
2	9	-.1210E-08
3	9	-.1841E-01
1	14	.8297E-02
2	14	-.1814E-08
3	14	-.1570E-01
1	17	.8109E-02
2	17	-.1505E-08
3	17	-.1633E-01
1	7	.7220E-02
2	7	.1481E-02
3	7	-.1531E-01
1	18	.7326E-02
2	18	.7709E-03
3	18	-.1515E-01
1	19	.8021E-02
2	19	.1748E-02
3	19	-.1653E-01

FINE GRID ELEMENT = 3

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	1	3	3	.935E+00	.924E-01	.463E+00	11	2	5	3	.102E+01	.202E+00	.463E+00
2	3	3	3	.113E+01	.112E+00	.463E+00	12	1	4	3	.929E+00	.138E+00	.463E+00
3	3	5	3	.111E+01	.221E+00	.463E+00	13	1	3	4	.988E+00	.983E-01	.564E+00
4	1	5	3	.921E+00	.183E+00	.463E+00	14	3	3	4	.117E+01	.117E+00	.563E+00
5	1	3	5	.105E+01	.104E+00	.662E+00	15	3	5	4	.115E+01	.228E+00	.562E+00
6	3	3	5	.122E+01	.122E+00	.660E+00	16	1	5	4	.968E+00	.191E+00	.562E+00
7	3	5	5	.120E+01	.234E+00	.658E+00	17	2	3	5	.113E+01	.113E+00	.661E+00
8	1	5	5	.102E+01	.198E+00	.660E+00	18	3	4	5	.121E+01	.179E+00	.659E+00
9	2	3	3	.103E+01	.102E+00	.463E+00	19	2	5	5	.111E+01	.216E+00	.659E+00
10	3	4	3	.112E+01	.167E+00	.463E+00	20	1	4	5	.103E+01	.153E+00	.661E+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.1473E-01
2	4	.3947E-02
3	4	-.2136E-01
1	1	.1498E-01
2	1	.2056E-02
3	1	-.2177E-01

		..3421EE-01
1	5	.1176E-01
2	5	.2017E-02
3	5	-.1992E-01
1	8	.1172E-01
2	8	.3892E-02
3	8	-.1959E-01
1	12	.1466E-01
2	12	.3022E-02
3	12	-.2155E-01
1	13	.1330E-01
2	13	.2032E-02
3	13	-.2006E-01
1	20	.1174E-01
2	20	.2973E-02
3	20	-.1976E-01
1	16	.1316E-01
2	16	.3911E-02
3	16	-.2051E-01
1	3	.1170E-01
2	3	.2914E-02
3	3	-.1815E-01
1	7	.9086E-02
2	7	.3101E-02
3	7	-.1620E-01
1	11	.1314E-01
2	11	.3399E-02
3	11	-.1973E-01
1	19	.1022E-01
2	19	.3462E-02
3	19	-.1787E-01
1	15	.1036E-01
2	15	.3079E-02
3	15	-.1712E-01
1	2	.1108E-01
2	2	.1517E-02
3	2	-.1832E-01
1	10	.1179E-01
2	10	.2231E-02
3	10	-.1823E-01
1	9	.1336E-01
2	9	.1771E-02
3	9	-.1999E-01

FINE GRID ELEMENT = 4

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	1	3	5	.109E+01	.104E+00	.662E+00	11	2	5	5	.111E+01	.216E+00	.659F+00
2	3	3	5	.122E+01	.122E+00	.660E+00	12	1	4	5	.103E+01	.153E+00	.661E+00
3	3	5	5	.126E+01	.234E+00	.658E+00	13	1	3	6	.111E+01	.110E+00	.758E+00
4	1	5	5	.102E+01	.198E+00	.660E+00	14	3	3	6	.128E+01	.127E+00	.756E+00
5	1	3	7	.117E+01	.116E+00	.852E+00	15	3	5	6	.124E+01	.261E+00	.756E+00
6	3	3	7	.133E+01	.132E+00	.849E+00	16	1	5	6	.107E+01	.206E+00	.755E+00
7	3	5	7	.129E+01	.247E+00	.847E+00	17	2	3	7	.129E+01	.124E+00	.850E+00
8	1	5	7	.113E+01	.213E+00	.849E+00	18	3	4	7	.132E+01	.192E+00	.848E+00
9	2	3	5	.113E+01	.113E+00	.661E+00	19	2	5	7	.121E+01	.230E+00	.848E+00
10	3	4	5	.121E+01	.179E+00	.659E+00	20	1	4	7	.115E+01	.167E+00	.850F+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	4	.1172E-01
2	4	.3892E-02
3	4	-.1959E-01
1	1	.1176E-01
2	1	.2017E-02
3	1	-.1992E-01
1	5	.9158E-02
2	5	.3041E-02

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3        5        .1783E-01
1        8        .9240E-02
2        8        .3900E-02
3        8       -.1756E-01
1       12        .1174E-01
2       12        .2973E-02
3       12       -.1976E-01
1       13        .1030E-01
2       13        .2011E-02
3       13       -.1691E-01
1       20        .9190E-02
2       20        .2976E-02
3       20       -.1770E-01
1       16        .1041E-01
2       16        .3891E-02
3       16       -.1861E-01
1        3        .9086E-02
2        3        .3101E-02
3        3       -.1620E-01
1        7        .6721E-02
2        7        .2720E-02
3        7       -.1466E-01
1       11        .1022E-01
2       11        .3482E-02
3       11       -.1787E-01
1       19        .7698E-02
2       19        .3316E-02
3       19       -.1609E-01
1       15        .7872E-02
2       15        .2982E-02
3       15       -.1538E-01
1        6        .7226E-02
2        6        .1461E-02
3        6       -.1531E-01
1       18        .7018E-02
2       18        .2131E-02
3       18       -.1515E-01
1       17        .8021E-02
2       17        .1748E-02
3       17       -.1653E-01
```

FINE GRID ELEMENT =   5

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	1	3	.113E+01	0.	.463E+00	11	4	3	3	.122E+01	.121E+00	.463E+00
2	5	1	3	.132E+01	0.	.463E+00	12	3	2	3	.113E+01	.560E-01	.463E+00
3	5	3	3	.132E+01	.131E+00	.463E+00	13	3	1	4	.110E+01	0.	.564E+00
4	3	3	3	.113E+01	.112E+00	.463E+00	14	5	1	4	.135E+01	0.	.562E+00
5	3	1	5	.123E+01	0.	.662E+00	15	5	3	4	.136E+01	.135E+00	.562E+00
6	5	1	5	.141E+01	0.	.660E+00	16	3	3	4	.117E+01	.117E+00	.563E+00
7	5	3	5	.140E+01	.139E+00	.658E+00	17	3	1	5	.132E+01	0.	.661E+00
8	3	3	5	.122E+01	.122E+00	.660E+00	18	5	1	5	.141E+01	.708E-01	.659E+00
9	4	1	3	.122E+01	0.	.463E+00	19	4	3	5	.131E+01	.131E+00	.659E+00
10	5	2	3	.132E+01	.656E-01	.463E+00	20	3	2	5	.123E+01	.621E-01	.661E+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.9539E-02
2	2	-.1042E-08
3	2	-.1530E-01
1	3	.9414E-02
2	3	.1108E-02
3	3	-.1518E-01
1	7	.7916E-02
2	7	.1325E-02
3	7	-.1391E-01

2	6	-.1936E-08
3	6	-.1355E-01
1	10	.9478E-02
2	10	.5621E-03
3	10	-.1524E-01
1	15	.8634E-02
2	15	.1291E-02
3	15	-.1448E-01
1	18	.7770E-02
2	18	.6980E-03
3	18	-.1389E-01
1	14	.8471E-02
2	14	-.1576E-08
3	14	-.1443E-01
1	1	.1205E-01
2	1	.8887E-09
3	1	-.1649E-01
1	5	.9402E-02
2	5	-.1608E-08
3	5	-.1660E-01
1	9	.1071E-01
2	9	-.4981E-09
3	9	-.1685E-01
1	17	.8393E-02
2	17	-.1050E-08
3	17	-.1506E-01
1	13	.1065E-01
2	13	-.1230E-08
3	13	-.1761E-01
1	4	.1186E-01
2	4	.1517E-02
3	4	-.1632E-01
1	12	.1197E-01
2	12	.7736E-03
3	12	-.1841E-01
1	11	.1057E-01
2	11	.1296E-02
3	11	-.1672E-01

FINE GRID ELEMENT = 6

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	1	5	.123E+01	0.	.662E+00	11	4	3	5	.131E+01	.131E+00	.659E+00
2	5	1	5	.141E+01	0.	.660E+00	12	3	2	5	.123E+01	.621E-01	.661E+00
3	5	3	5	.140E+01	.139E+00	.658E+00	13	3	1	6	.129E+01	0.	.758E+00
4	3	3	5	.122E+01	.122E+00	.660E+00	14	5	1	6	.146E+01	0.	.755E+00
5	3	1	7	.136E+01	0.	.852E+00	15	5	3	6	.145E+01	.144E+00	.794E+00
6	5	1	7	.151E+01	0.	.849E+00	16	3	3	6	.128E+01	.127E+00	.756E+00
7	5	3	7	.150E+01	.148E+00	.847E+00	17	4	1	7	.143E+01	0.	.850E+00
8	3	3	7	.133E+01	.132E+00	.849E+00	18	5	2	7	.151E+01	.760E-01	.848E+00
9	4	1	5	.132E+01	0.	.661E+00	19	4	3	7	.142E+01	.140E+00	.848E+00
10	5	2	5	.141E+01	.708E-01	.659E+00	20	3	2	7	.135E+01	.681E-01	.850E+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.7517E-02
2	2	-.1936E-08
3	2	-.1355E-01
1	3	.7916E-02
2	3	.1325E-02
3	3	-.1391E-01
1	7	.6628E-02
2	7	.9415E-03
3	7	-.1313E-01
1	6	.5956E-02
2	6	-.2135E-08

3	8	-.xxxxxx-xx
1	10	.7770E-C2
2	10	.6988E-03
3	10	-.1389E-01
1	15	.7246E-02
2	15	.1209E-02
3	15	-.1340E-01
1	18	.6397E-02
2	18	.5164E-03
3	18	-.1274E-C1
1	14	.6679E-02
2	14	-.2123E-08
3	14	-.1264E-01
1	1	.9402E-02
2	1	-.1608E-08
3	1	-.1668E-01
1	5	.7330E-02
2	5	-.1849E-08
3	5	-.1467E-01
1	9	.8393E-C2
2	9	-.1850E-08
3	9	-.1506E-01
1	17	.6592E-02
2	17	-.2066E-C8
3	17	-.1313E-C1
1	13	.8297E-02
2	13	-.1814E-08
3	13	-.1570E-01
1	8	.7228E-02
2	8	.1481E-C2
3	8	-.1531E-01
1	19	.6756E-02
2	19	.1212E-02
3	19	-.1418E-01
1	20	.7326E-62
2	20	.7709E-03
3	20	-.1515E-01

FINE GRID ELEMENT = 7

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	3	3	.113E+C1	.112E+00	.463E+00	11	4	5	3	.121E+01	.240E+00	.463E+00
2	5	3	3	.132E+C1	.131E+0C	.463E+00	12	3	4	3	.112E+C1	.167E+00	.463E+00
3	5	5	3	.131E+01	.260E+0C	.463E+00	13	3	3	4	.117E+01	.117E+00	.563E+00
4	3	5	3	.111E+C1	.221E+0C	.463E+00	14	5	3	4	.136E+01	.135E+00	.562E+00
5	3	3	5	.122E+01	.122E+0C	.66CE+00	15	5	5	4	.134E+01	.265E+00	.561E+00
6	5	3	5	.140E+01	.139E+0C	.658E+00	16	3	5	4	.115E+C1	.228E+00	.562E+CC
7	5	5	5	.136E+C1	.270E+0C	.657E+00	17	4	3	5	.131E+01	.131E+00	.659E+00
8	3	5	5	.120E+C1	.234E+0C	.658E+0C	18	5	4	5	.139E+01	.206E+00	.658E+00
9	4	3	3	.122E+01	.195E+0C	.463E+00	19	4	5	5	.129E+01	.252E+00	.658E+00
10	5	4	3	.131E+01	.195E+00	.463E+00	20	3	4	5	.121E+C1	.179E+00	.659E+00

POINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.9414E-02
2	2	.1106E-02
3	2	-.1518E-01
1	3	.9279E-02
2	3	.2137E-02
3	3	-.1511E-01
1	7	.7889E-C2
2	7	.2431E-02
3	7	-.1300E-01
1	6	.7916E-02
2	6	.1325E-62
3	6	-.1391E-01
1	10	.9348E-02
2	10	.1671E-02

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L    IV    .????E-??
3    10   -.1516E-01
1    15    .0569E-02
2    15    .2435E-02
3    15   -.1392E-01
1    16    .7956E-02
2    16    .1905E-02
3    10   -.1361E-01
1    14    .0639E-02
2    14    .1291E-02
3    14   -.1448E-01
1     4    .1170E-01
2     4    .2910E-02
3     4   -.1815E-01
1     8    .9066E-02
2     8    .3101E-02
3     8   -.1620E-01
1    11    .1041E-01
2    11    .2499E-02
3    11   -.1661E-01
1    16    .1036E-01
2    16    .3079E-02
3    16   -.1712E-01
1    19    .0300E-02
2    19    .2751E-02
3    19   -.1457E-01
1     1    .1100E-01
2     1    .1517E-02
3     1   -.1832E-01
1    12    .1179E-01
2    12    .2231E-02
3    12   -.1823E-01
1     9    .1057E-01
2     9    .1296E-02
3     9   -.1672E-01
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FINE GRID ELEMENT = 8

NODE	I	J	K	X-COORD	Y-COORD	Z-COORD	NODE	I	J	K	X-COORD	Y-COORD	Z-COORD
1	3	3	5	.122E+01	.122E+00	.660E+00	11	4	5	5	.129E+01	.252E+00	.658E+00
2	5	3	5	.140E+01	.139E+00	.658E+00	12	3	4	5	.121E+01	.179E+00	.659E+00
3	5	5	9	.138E+01	.270E+00	.697E+00	13	3	3	0	.128E+01	.127E+00	.798E+00
4	3	5	5	.126E+01	.234E+00	.658E+00	14	5	3	8	.145E+01	.144E+00	.754E+00
5	3	3	7	.133E+01	.132E+00	.849E+00	15	5	5	6	.142E+01	.276E+00	.752E+00
6	5	3	7	.150E+01	.148E+00	.847E+00	16	3	5	6	.124E+01	.241E+00	.754E+00
7	5	5	7	.146E+01	.281E+00	.845E+00	17	4	3	7	.142E+01	.148E+00	.848E+00
8	3	5	7	.129E+01	.247E+00	.847E+00	18	5	4	7	.146E+01	.216E+00	.846E+00
9	4	3	9	.131E+01	.131E+00	.899E+00	19	4	5	7	.139E+01	.204E+00	.846E+00
10	5	4	5	.139E+01	.206E+00	.658E+00	20	3	4	7	.132E+01	.192E+00	.848E+00

PCINT,CLAMP,AND SLOPE TYPE BC.

TYPE	NODE	VALUE
1	2	.79166E-02
2	2	.1325E-02
3	2	-.1391E-01
1	3	.7869E-02
2	3	.2431E-02
3	3	-.1300E-01
1	7	.6460E-02
2	7	.1516E-02
3	7	-.1195E-01
1	6	.6628E-02
2	6	.9415E-03
3	6	-.1313E-01
1	10	.7956E-02
2	10	.1905E-02
3	10	-.1361E-01
1	15	.????E-??

1	19	.7202E-02
2	15	.2125E-02
3	15	-.1234E-01
1	18	.6649E-02
2	18	.1275E-02
3	18	-.1206E-01
1	14	.7202E-02
2	14	.1209E-02
3	14	-.1346E-01
1	4	.9066E-02
2	4	.3101E-02
3	4	-.1620E-01
1	8	.6721E-02
2	8	.2720E-02
3	8	-.1466E-01
1	11	.8306E-02
2	11	.2791E-02
3	11	-.1457E-01
1	16	.7072E-02
2	16	.2902E-02
3	16	-.1538E-01
1	19	.6308E-02
2	19	.2181E-02
3	19	-.1328E-01
1	5	.7220E-02
2	5	.1461E-02
3	5	-.1531E-01
1	20	.7018E-02
2	20	.2131E-02
3	20	-.1515E-01
1	17	.6756E-02
2	17	.1212E-02
3	17	-.1418E-01

TIME IN REZONE   =   1.214 SECONDS

TIME IN FORMKF   =   3.772 SECONDS

TIME IN PREFRONT =   .308

TOTAL NUMBER OF D.O.F.S =   270

D.O.F. IN FRONT = 112

MAXIMUM ACTIVE STORAGE = 8966

TOTAL NICKNAME STORAGE =   224

BUFFER LENGTH =   18333

TIME IN FORWARD ELIMINATION =   7.580

NUMBER OF SECTORS(PRUS) =   201

TIME IN BACKSUBSTITUTION =   .643

TIME IN ZIPP   =   8.539 SECONDS

BLOCK   OPTION

BOUNDS

	MIN	MAX		MIN	MAX
X	-.1000E+21	.1000E+21	I	0	0
Y	-.1000E+21	.1000E+21	J	0	0
Z	-.1000E+21	.1000E+21	K	0	0

PRINT LEVEL = 4

STRESS POINTS FOR BRICK(DEGEN) ELEMENTS

POINT	S1	S2	S3
1	-1.000	-1.000	-1.000
2	1.000	-1.000	-1.000
3	1.000	1.000	-1.000
4	-1.000	1.000	-1.000
5	-1.000	-1.000	1.000
6	1.000	-1.000	1.000
7	1.000	1.000	1.000
8	-1.000	1.000	1.000
9	0.000	0.000	0.000

STRESS POINTS FOR PRISM ELEMENTS

POINT	S1	S2	S3	S4
1	1.000	0.000	0.000	-1.000
2	0.000	1.000	0.000	-1.000
3	0.000	0.000	1.000	-1.000
4	1.000	0.000	0.000	1.000
5	0.000	1.000	0.000	1.000
6	0.000	0.000	1.000	1.000
7	.333	.333	.333	0.000

STRESS POINTS FOR WEDGE ELEMENTS

POINT	S1	S2	S3
1	.050	0.000	-1.000
2	1.000	0.000	-1.000
3	1.000	1.000	-1.000
4	.050	0.000	1.000
5	1.000	0.000	1.000
6	1.000	1.000	1.000
7	.667	.500	0.000

STRESS POINTS FOR TETRA ELEMENTS

POINT	S1	S2	S3	S4
1	1.000	0.000	0.000	0.000
2	0.000	1.000	0.000	0.000
3	0.000	0.000	1.000	0.000
4	0.000	0.000	0.000	1.000
5	.250	.250	.250	.250

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DISPLACEMENTS FOR BRICKM ELEMENT NO. 1 MATERIAL = 1

I	J	K	U	V	W	M

STRESSES FOR BRICKM ELEMENT NO. 1 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICKH ELEMENT NO.   2 MATERIAL = 1

I	J	K	U	V	W	M

STRESSES FOR BRICKH ELEMENT NO.   2 MATERIAL = 1

PGINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMX

DISPLACEMENTS FOR BRICKH ELEMENT NO. 3 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKH ELEMENT NO. 3 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

DISPLACEMENTS FOR BRICKH ELEMENT NO. 4 MATERIAL = 1

I	J	K	U	V	W

STRESSES FOR BRICKH ELEMENT NO. 4 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
28													
29													
30													
31													
32													
33													
34													
35													
36													

DISPLACEMENTS FOR BRICKH ELEMENT NO. 6 MATERIAL = 1

I	J	K	U	V	W	M

STRESSES FOR BRICKH ELEMENT NO. 6 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMX

DISPLACEMENTS FOR BRICK ELEMENT NO. 7 MATERIAL = 1

I	J	K	U	V	W	H

STRESSES FOR BRICK ELEMENT NO. 7 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZX GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX
55													
56													
57													
58													
59													
60													
61													
62													
63													

DISPLACEMENTS FOR BRICKH ELEMENT NO.   8 MATERIAL = 1

I	J	K	U	V	W	N	M

STRESSES FOR BRICKH ELEMENT NO.   8 MATERIAL = 1

POINT	X	Y	Z	SIGMAX EPSX	SIGMAY EPSY	SIGMAZ EPSZ	TAUXY GAMMAXY	TAUYZ GAMMAYZ	TAUZK GAMMAZX	SIGMA1 EPS1	SIGMA2 EPS2	SIGMA3 EPS3	TAUMAX GAMMAMAX

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST ELEMENT I J K	POINT NO.	STRESS	SECOND ELEMENT I J K	POINT NO.	STRESS	THIRD ELEMENT I J K	POINT NO.	STRESS
MATERIAL NUMBER = 1									
SIGMA MAX	3 3 3	57	.155E+05	1 3 5	32	.003E+04	1 1 5	17	.003E+04
SIGMA MIN	1 3 5	35	-.134E+05	1 1 5	14	-.719E+04	3 3 3	56	-.590E+04
TAU MAX	1 3 5	35	.303E+03	1 1 3	1	.275E+03	1 1 5	13	.269E+03
EPS MAX	1 1 3	1	.231E-01	1 1 3	4	.219E-01	1 3 3	19	.219E-01
EPS MIN	1 3 5	35	-.276E-01	1 1 5	13	-.227E-01	1 1 3	8	-.227E-01
GAMMA MAX	1 3 5	35	.478E-01	1 1 3	1	.634E-01	1 1 5	13	.625E-01

TIME IN POST = 1.120 SECONDS

TIME IN STOP = 05.561 SECONDS

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          NICOM SCOPE 3.4.2 HM SN 68 HXM 9.0 14.27
15.22.50.NM1KPBM  FROM   /KP
15.22.50.IP  00000076 WORDS ¬ FILE INPUT  , DC 00
15.22.50.NM1KP,T1000,CM200000,L1020.
15.22.59.7E41K18N05 7280  A3 HACKETT    0M01
15.23.00.LIMIT(1000)
15.23.00.ATTACH(TEX30,KPXXXMH,IO=KPXXX,CY=3,MR=1)
15.23.00.DISPOSE(OUTPUT,*PR=C)
15.41.54.LOSET(PRESET=ZERO)
15.41.54.TEX30.
16.29.10. NON-FATAL ERROR(S) IN OVERLAY GEN.
16.37.31.     STOP
16.37.31.     85.500 CP SECONDS EXECUTION TIME
16.37.31.EXIT.
16.37.31.OP  00043000 WORDS - FILE OUTPUT , DC 40
16.37.31.MS  43000  WORDS ( 340400 MAX USED)
16.37.31.CPA      92.477 SEC.       83.238 ADJ.
16.37.31.IO       96.901 SEC.       54.636 ADJ.
16.37.31.CM     9367.442 KWS.       95.276 ADJ.
16.37.32.PP     198.389 SEC.     DATE 10/18/77
16.37.32.EJ  END OF JOB, KP
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LINE   DIRECT LIST OF INPUT DATA

    1 $FLNOCYL - STAR TO CYLINDRICAL BORE TRANSITION (I)
    2 SETUP,4,PRESCRIB
    3 ISO,PROPELLANT,1,1 9E4,.499
    4 ISO,CASE,2,3.E7,.3
    5 END,MATERIALS
    6 BLOCK-G,1, 1,1,1, 2,5,3, 7,.5     $ PROPELLANT NODES
    7 .9,.,..., 2.447,...,. 1.730,1.730,..., .665,.665,./
    8 .9,.0,.403, 2.447,..,.403, 1.730,1.730,.403, .665,.665,.403
    9 10,2.430,.651,00, 12,.814,.470,0, 16,2.430,.651,.403, 20,.814,.470,.403/
   10 22,2.180,1.258,0, 24, 960,.2+3,0, 30,2 180,.1 258,.403, 32,.908,.243,.403
   11 BLOCK-G,.. 1,1,3, 2,5,7, 7,.5     $ PROPELLANT NODES
   12 .9,.0,.403, 2.447,..,.403, 1.730,1.730,.403, .665,.665,.403/
   13 2.1,.5,0,1.942, 2.447,..,1.942, 1 730,1./30,1 942, .665,.665,1.942
   14 1,.2.430,.651,.403, .2,.814,.470,.403, 13,..31,0,..973/
   15 16,2.430,.651,1.942, 20,1.15,.33,1.942, 22,2.180,1.258,.,.03/
   16 24,.907,.243,.403, 25,1.775,0,1.432, 30,2.180,1.258,1.942/
   17 32,1 75, 33,1.942
   18 BLOCK-G,.. 1,1,7, 2,5,9, 7,..     $ PROPELLANT NODES
   19 2.1,.5,0,1.942, 2.447,..,1.942, 1.730,1,.730,1.942, .665,.665,1.942/
   20 2.1,.5,0,2.405, 2.447,.,2.405, 1.730,1,.730,2.405, .665,.665,2.405
   21 1,.2.430,.651,1.942, 12,1.15,.33,1.942, 16,2.43,.651,2.4.5, 2,.1.15,.33,2.405/
   22 22,2.180,1.258,1.942, 24,1.75,.33,1.942, 30,2.18,1.258,2.405, 32,1.75,.33,2.405
   23 BLOCK,2, 5,1,1, 7,5,3     $ CASE NODES
   24 2.447,0,.,2.51/,0,..,2.517,.45,0,2.447,.45,./
   25 2.447,0,.403,2.517,0,.403,2.317,.45,.403,2.447,.45,.403
   26 BLOCK,2, 5,1,3, 7,5,7     $ CASE NODES
   27 2.447,0,.403,2.517,0,.403,2.317,.45,.403,2.447,.45,.403/
   28 2.447,0,1.942,2.517,..1.942,2.517,.45,1.9.2,2.447,.45,1.942
   29 BLOCK,2, 5,1,7, 7,5,9     $ CASE NODES
   30 2.447,0,1.9.2,2.517,..1.942,2.517,.45,1.9.2,2.447,.45,1.942/
   31 2.447,0,2.405,2.517 0,2.405,2.517,.45,2.405,2.447,.45,2.405
   32 END,GRID
   33 KLOOP,4
   34 ILOOP,2
   35 JLOOP,2
   36 BRICKM,1, 1,1,1     $ PROPELLANT ELEMENTS
   37 JEND
   38 IEND
   39 KEND
   40 KLOOP,4
   41 JLOOP,2
   42 BRICK,2, 5,1,1     $ CASE ELEMENTS
   43 JEND
   44 KEND
   45 KLOOP,4
   46 ILOOP,3
   47 BC,SLOPE,1,1,1, 5     $ 0 DEGREE FACE
   48 BC,SLOPE,1,3,1, 2     $ 45 DEGREE FACE
   49 IEND
   50 KEND
   51 JLOOP,2
   52 BC,SLOPE,5,1,1, 6     $ END OF CASE
   53 JEND
   54 KLOOP,4
   55 JLOOP,2
   56 BC,PRESSURE, 1,1,1, 4,1.425E3     $ 1425 PSI PRESSURE
   57 JEND
   58 KEND
   59 BC,JZ,1,1,1, 6,-2.184E-2
   60 BC,JZ,1,2,1, 6,-2.184E-2
   61 BC,JZ,1,3,1, 6,-2.184E-2
   62 BC JZ,1,.,1, 6,-2.184E-2
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u3 BC,UZ,1,5,1, 0,-2.184E-2
04 BC,UZ,2,1,1, 0,-1.63EE-2
05 BC,UZ,2,3,1, 0,-1.63EE-2
06 BC,UZ,2,5,1, 0,-1.63EE-2 .
07 BC,UZ,3,1,1, 0,-1.692E-2
08 BC,UZ,3,2,1, 0,-1.692E-2
09 BC,UZ,3,3,1, 0,-1.692E-2
70 BC,UZ,3,4,1, 0,-1.692E-2
71 BC,UZ,3,5,1, 0,-1.692E-2
72 BC,UZ,4,1,1, 0,-0.540E-2
73 BC,UZ,4,3,1, 0,-0.540E-2
74 BC,UZ,4,5,1, 0,-0.540E-2
75 BC,UZ,5,1,1, 0.0.
76 BC,UZ,5,2,1, 0.0.
77 BC,UZ,5,3,1, 0.0.
78 BC,UZ,5,4,1, 0.0.
79 BC,UZ,5,5,1, 0.0.
80 BC,UZ,1,1,9, 0,-.213E-2
81 BC,UZ,1,2,9, 0,-.206E-2
82 BC,UZ,1,3,9, 0,-.347E-2
83 BC,UZ,1,4,9, 0,-.435E-2
84 BC,UZ,1,5,9, 0,-.462E-2
85 BC,UZ,2,1,9, 0,-.216E-2
86 BC,UZ,2,3,9, 0,-.296E-2
87 BC,UZ,2,5,9, 0,-.384E-2
88 BC,UZ,3,1,9, 0,-.164E-2
89 BC,UZ,3,2,9, 0,-.206E-2
90 BC,UZ,3,3,9, 0,-.257E-2
91 BC,UZ,3,4,9, 0,-.317E-2
92 BC,UZ,3,5,9, 0,-.341E-2
93 BC,UZ,4,1,9, 0,-.118E-2
94 BC,UZ,4,3,9, 0,-.194E-2
95 BC,UZ,4,5,9, 0,-.236E-2
96 BC,UZ,5,1,9, 0,-.153E-2
97 BC,UZ,5,2,9, 0,-.153E-2
98 BC,UZ,5,3,9, 0,-.153E-2
99 BC,UZ,5,4,9, 0,-.153E-2
100 BC,UZ,5,5,9, 0,-.153E-2
101 END,ELEMENTS
102 SOLVE
103 POST
104 BLOCK
105 OPTION,2
106 END,POST
107 REZONE,1,1,5, 3,3,9
108 REFINE,GRADS,1,1,5, 2,2,2
109 REFINE,GRADS,1,1,7, 2,2,2
110 BCR,REZONE,1,1,5, 2,2,2,2,2, 1,1,5
111 BCR,REZONE,1,1,7, 2,2,2,2,2,2, 1,1,9
112 BC,PRESSURE,1,1,5, 4,1.-25E3
113 BC,PRESSURE,1,1,7, 4,1.425E3
114 REPOS,REZONE,1,1,5
115 REPOS,REZONE,1,1,7
116 END,CONTROL
117 POINT,1,1,2,5, 2.648,.233,1.942
118 POINT,1,1,3,5, 1.815,.33,1.942
119 END,SET
120 POINT,1,1,2,1, 2.648,.233,1.942
121 POINT,1,1,3,1, 1.815,.33,1.942
122 POINT,1,1,2,2, 2.648,.233,2.06
123 POINT,1,1,3,2, 1.815,.33,2.05
124 POINT,1,1,2,3, 2.648,.233,2.17
125 POINT,1,1,3,3, 1.815,.33,2.17
126 POINT,1,1,2,4, 2.648,.233,2.29
127 POINT,1,1,3,4, 1.815,.33,2.29
128 POINT,1,1,2,5, 2.648,.233,2.40
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128 PO...............................................
129 POINT,1,1,3,5, 1,6,5,,33,2,4,5
130 END,SET
131 SOLVE
132 POST
133 BLOCK
134 OPTION,2
135 END,POST
136 REZONE,1,1,7, 3,3,,1
137 REFINE,GRADS,1,1,7, 2,2,2
138 REFINE,GRADS,1,1,9, 2,2,2
139 BCR,REZONE, 1,1,7, 2,2,2,2,2,2, 1,1,7
140 BCR,REZONE, 1,1,9, 2,2,2,2,2,2, 1,1,11
141 END,CONTROL
142 SOLVE
143 POST
144 BLOCK
145 OPTION,2
146 END,POST
147 STOP

TIME IN FFLDS3     =     1.141 SECONDS
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ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

			FIRST				SECOND				THIRD	
	ELEMENT I J K	POINT NO.	STRESS		ELEMENT I J K	POINT NO.	STRESS		ELEMENT I J K	POINT NO.	STRESS

MATERIAL NUMBER = 1

	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS
SIGMA MAX	1 1 4	4	-.037E+03	1 1 1	1	-.041E+03	3 1	1	-.001E+03
SIGMA MIN	3 1 1	20	-.103E+04	3 1 1	21	-.108E+04	3 3	29	-.108E+04
TAU MAX	1 1 5	73	.276E+03	1 1 3	41	.276E+03	1 3	37	.275E+03
EPS MAX	1 1 1	4	.234E-01	1 1 1	5	.231E-01	3 1	16	.231E-01
EPS MIN	1 1 5	73	-.232E-01	1 1 3	41	-.292E-01	1 1	77	-.292E-01
GAMMA MAX	1 1 5	73	-.035E-01	1 1 3	41	.035E-01	1 3	37	.036E-01

MATERIAL NUMBER = 2

	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS
SIGMA MAX	5 3 7	209	.5E+05	5 3 1	216	.507E+05	5 3	155	.333E+05
SIGMA MIN	5 1 7	203	-.122E+05	5 1 7	266	-.127E+05	5 1	199	-.126E+05
TAU MAX	5 3 1	154	.290E+05	5 3 1	157	.209E+05	5 3	208	.205E+05
EPS MAX	5 3 1	156	.178E-02	5 3 7	216	.177E-02	5 3	196	.177E-02
EPS MIN	5 1 7	203	-.032E-03	5 1 7	199	-.593E-03	5 3	212	-.707E-03
GAMMA MAX	5 3 1	154	.252E-02	5 3 1	157	.251E-02	5 3	268	.207E-02

TIME IN POST = 3.163 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 16

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 11

COARSE GRID ELEMENT = 1

NODE K J I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1 5 1 1	.194E+01	0.	.120E+01	11	5 3 2	.143E+..	.89E+01	.12.E+ 1
2 5 1 3	.139E+01	0.	.120E+01	12	5 3 1	.106E+01	.246E+00	.12E+ 1
3 5 3 3	.172E+01	.646E+03	.120E+01	13	6 1 1	.106E+01	0.	.15E+.1
4 5 3 1	.136E+01	.345E+03	.120E+01	14	6 1 3	.217E+01	0.	.15E+.1
5 7 1 1	.235E+01	0.	.194E+01	15	6 3 3	.179E+.1	.627E+00	.157E+.1
6 7 1 3	.169E+01	.646E+00	.194E+01	16	6 3 1	.133E+.1	.337E+00	.156E+.1
7 7 3 3	.106E+00	.336E+00	.194E+01	17	7 1 2	.222E+.1	0.	.194E+.1
8 7 3 1	.177E+01	0.	.120E+01	18	7 3 3	.217E+.1	.390E+00	.194E+.1
9 5 1 2	.177E+01	0.	.120E+01	19	7 3 2	.167E+.1	.499E+00	.194E+.1
10 5 2 3	.142E+01	.363E+..	.123E+01	2.	7 2 1	.106E+.1	.30E+00	.194E+.1

COARSE GRID ELEMENT = 13

NODE	N G Z	X COORD	Y COORD	Z COORD	NODE	N G Z	X COORD	Y COORD	Z COORD
1	70101	.215E+01	0.	.194E+01	11	70302	.167E+01	.489E+00	.194E+01
2	70103	.230E+01	0.	.194E+01	12	70201	.188E+01	.384E+00	.194E+01
3	70303	.189E+01	.640E+00	.194E+01	13	80101	.215E+01	0.	.217E+01
4	70301	.160E+01	.330E+00	.194E+01	14	80103	.230E+01	0.	.217E+01
5	90101	.215E+01	0.	.241E+01	15	80303	.187E+01	.632E+00	.217E+01
6	90103	.230E+01	0.	.241E+01	16	80301	.166E+01	.330E+00	.217E+01
7	90303	.194E+01	.612E+00	.241E+01	17	90102	.222E+01	0.	.241E+01
8	90301	.146E+01	.330E+00	.241E+01	18	902.3	.215E+01	.391E+00	.241E+01
9	70102	.222E+01	0.	.194E+01	19	90302	.166E+01	.464E+00	.241E+01
10	70203	.217E+01	.390E+00	.194E+01	20	90201	.188E+01	.384E+00	.241E+01

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST					SECOND					THIRD		
ELEMENT			POINT NO.	STRESS	ELEMENT			POINT NO.	STRESS	ELEMENT			POINT NO.	STRESS
I	J	K			I	J	K			I	J	K		

MATERIAL NUMBER = 1

SIGMA MAX	3	1	11	123	.025E+04	1	3	11	166	.012E+06	3	1	1	30	-.16E+06
SIGMA MIN	1	3	11	107	-.078E+06	1	1	11	86	-.061E+06	1	1	11	87	-.36E+06
TAU MAX	1	3	9	95	.613E+03	1	3	11	166	.736E+03	1	3	11	166	.303E+03
EPS MAX	1	3	9	95	.665E+01	1	3	11	166	.326E+01	1	3	11	166	.326E-01
EPS MIN	1	3	11	100	-.625E+01	1	3	9	95	-.621E-01	1	1	1	1	-.292E-01
GAMMA MAX	1	3	9	95	.123E+00	1	3	11	166	.135E-06	1	3	11	166	.573E-01

TIME IN POST = 2.607 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 16

MAXIMUM DIMENSION OF REFINE G GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 11

COARSE GRID ELEMENT = 2

NODE	K	J	I	X-COORD	Y-COORD	Z-COORD	NODE	K	J	I	X-COORD	Y-COORD	Z-COORD
1	7	6	1	.190E+01		.135E+01	11	7	0	362	.176E+01	.297E+00	.156E+01
2	7	5	3	.202E+01		.135E+01	12	7	0	261	.179E+01	.163E+00	.156E+01
3	7	5	3	.196E+01	.328E+00	.135E+01	13	8	0	161	.263E+01		.174E+01
4	7	3	1	.175E+01	.274E+00	.135E+01	14	8	0	163	.213E+01		.175E+01
5	9	3	1	.215E+01		.196E+01	15	8	0	363	.195E+01	.335E+00	.175E+01
6	9	1	3	.222E+01		.136E+01	16	8	0	361	.176E+01	.209E+00	.175E+01
7	9	3	3	.203E+01	-.367E+03	.136E+01	17	9	0	162	.218E+01		.194E+01
8	9	3	1	.102E+01	.330E+00	.136E+01	18	9	6	243	.214E+01	.196E+00	.194E+01
9	7	1	2	.195E+01		.135E+01	19	9	0	362	.195E+01	.326E+00	.194E+01
10	7	2	3	.196E+01	.190E+00	.135E+01	20	9	0	261	.205E+01	.233E+00	.194E+01

COARSE GRID ELEMENT = 3

NODE	K	J	I	X-COORD	Y-COORD	Z-COORD	NODE	K	J	I	X-COORD	Y-COORD	Z-COORD
1	9	2	161	.215E+01		.196E+01	11	9	0	362	.195E+01	.326E+00	.194E+01
2	9	0	103	.222E+01		.196E+01	12	9	0	261	.265E+01	.233E+00	.194E+01
3	9	0	363	.263E+01	-.367E+00	.196E+01	13	10	0	161	.215E+01		.206E+01
4	9	0	361	.192E+01	.336E+00	.196E+01	14	10	0	163	.222E+01		.206E+01
5	11	2	1	.215E+01		.217E+01	15	10	0	363	.202E+01	.347E+00	.206E+01
6	11	0	163	.222E+01		.217E+01	16	10	0	361	.182E+01	.336E+00	.206E+01
7	11	0	363	.202E+01	-.367E+03	.217E+01	17	11	0	162	.218E+01		.217E+01
8	11	3	1	.182E+01	.330E+00	.217E+01	18	11	2	263	.214E+01	.208E+00	.217E+01
9	9	1	2	.210E+01		.136E+01	19	11	3	2	.195E+01	.325E+00	.217E+01
10	9	2	03	.216E+01	.190E+00	.136E+01	20	11	0	261	.265E+01	.233E+00	.217E+01

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ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST					SECOND					THIRD				
	ELEMENT			POINT NO.	STRESS	ELEMENT			POINT NO.	STRESS	ELEMENT			POINT NO.	STRESS
	I	J	K			I	J	K			I	J	K		
MATERIAL NUMBER															
SIGMA MAX	1	1	3	84	.164E+05	1	3	3	104	.140E+05	3	1	3	126	.126E+05
SIGMA MIN	1	3	7	22	-.133E+05	1	1	3	86	-.204E+05	3	1	3	123	-.135E+05
TAU MAX	3	1	3	120	.105E+04	3	1	1	115	.086E+03	3	3	.	132	.065E+03
EPS MAX	3	3	9	69	.549E-1	3	1	3	52	.39E-01	3	1	1	111	.091E-01
EPS MIN	3	3	3	126	-.530E-1	3	3	3	137	-.94E-01	3	1	1	115	-.596E-01
GAMMA MAX	3	1	1	126	.018E-0	3	1	1	115	.08E+04	3	3	3	137	.108E-04

TIME IN POST   =   2.46 SECONDS
TIME IN STOP   =   122.537 SECONDS

```
                    MICOM SCOPE 3.4.2 MM SN 48 MXM R.0 14.57
15.51.43.MM1KPCM  FROM    /KP
15.51.43.IP  .3..1472 WORDS - FILE INPUT  , 33 .3
15.51.44.MM1KP,T1000,CM264668,L1000.
15.51.4..                                              600186
15.51.45.3F35K1FF05 7284  AJ MACKETT    8M01
15 51.45 LIMIT(1666)
15.51.45.
15.51.45.ATTACH(TEX38,KPXXXMM,IO=KPXXX,CY=3,MR=1)
15.51.45.
15.51.45 DISPOSE(OUTPUT,*PK=C)
15.51.46.
15.51.48.LOSE1(PRESET=ZERO)
15.51.48.
15.51.48.TEX38.
15.51.45.
16.05.15. NON-FATAL ERROR(S) IN OVERLAY GEN.
16.31.45.LOCKIN.
16.32.3..UNLOCK.
16 35.1.     STOP
16.35.1..  122.561 CP SECONDS EXECUTION TIME
16.35.1..EXIT.
16.35.10.
16.35.13 OP  66697728 WORDS - FIL. OUTPUT , 33 43
16.35.1..4S   6.928  WORDS (  347843 MAX USED)
16.35.10.CPA   129.764 SEC.      115.745 ADJ.
16.35.1..IO    141.122 SEC.       73.833 ADJ.
16.35.1..CM  13569 419 KWS.      137.464 ADJ
16.35.1..PP    271.886 SEC.      DATE 11/26/77
16.35.1..EJ  END OF JOB, KP
```

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```
LINE    DIRECT LIST OF INPUT DATA

    1 SFINOCYL - STAR TO CYLINDRICAL BORE TRANSITION (I)
    2 SETUP,4,PRESCRIB
    3 ISO,PROPELLANT,1.,7E3,.499,-.013245
    4 ISO,CASE,2,3,E7,.3
    5 END,MATERIALS
    6 BLOCK-C,1, 1,1,1, 9,9,3, 7,.5      $ PROPELLANT NODES
    7 .94,0,0, 2.447,0,0, 1.736,1.730,0, .665,.665,0/
    8 .94,0,.463, 2.447,0,.463, 1.730,1.730,.463, .665,.665,.463
    9 10,2.430,.651,0, 12,.014,.476,3, 18,2.430,.651,.463, 20,.014,.470,.463/
   10 22,2.100,1.250,0, 24,.900,.243,5, 30,2.100,1.250,.463, 32,.900,.243,.463
   11 BLOCK-C,1, 1,1,3, 5,5,7, 7,.5      $ PROPELLANT NODES
   12 .94,0,.463, 2.447,0,.463, 1.730,1.730,.463, .665,.665,.463/
   13 2.145,0,1.942, 2.447,0,1.942, 1.730,1.730,1.942, .665,.665,1.942
   14 10,2.430,.651,.463, 12,.014,.471,.463, 13,1.31,0,.973/
   15 18,2.430,.651,1.942, 20,1.15,.33,1.942, 22,2.100,1.250,.463/
   16 24,.907,.243,.463, 25,1.775,0,1.432, 30,2.100,1.250,1.942/
   17 32,1.75,.33,1.942
   18 BLOCK-C,1, 1,1,7, 9,9,9, 7,.5      $ PROPELLANT NODES
   19 2.145,0,1.942, 2.447,0,1.942, 1.730,1.730,1.942, .665,.665,1.942/
   20 2.145,0,2.405, 2.447,0,2.405, 1.730,1.730,2.405, .665,.665,2.405
   21 10,2.430,.651,1.942, 12,1.15,.33,1.942, 18,2.430,.651,2.405, 20,1.15,.33,2.405/
   22 22,2.100,1.250,1.942, 24,1.75,.33,1.942, 30,2.100,1.250,2.405, 32,1.75,.33,2.405
   23 BLOCK,2, 5,1,1, 7,5,3      $ CASE NODES
   24 2.447,0,0,2.517,0,0,2.517,45,0,2.447,45,3/
   25 2.447,0,.463,2.517,0,.463,2.517,45,.463,2.447,45,.463
   26 BLOCK,2, 5,1,3, 7,5,7      $ CASE NODES
   27 2.447,0,.463,2.517,0,.463,2.517,45,.463,2.447,45,.463/
   28 2.447,0,1.942,2.517,0,1.942,2.517,45,1.942,2.447,45,1.942
   29 BLOCK,2, 5,1,7, 7,5,9      $ CASE NODES
   30 2.447,0,1.942,2.517,0,1.942,2.517,45,1.942,2.447,45,1.942/
   31 2.447,0,2.405,2.517,0,2.405,2.517,45,2.405,2.447,45,2.405
   32 END,GRID
   33 KLOOP,4
   34 ILOOP,2
   35 JLOOP,2
   36 BRICKH,1, 1,1,1      $ PROPELLANT ELEMENTS
   37 JEND
   38 IEND
   39 KEND
   40 KLOOP,4
   41 JLOOP,2
   42 BRICK,2, 5,1,1      $ CASE ELEMENTS
   43 JEND
   44 KEND
   45 KLOOP,4
   46 ILOOP,3
   47 BC,SLOPE,1,1,1, 5      $  0 DEGREE FACE
   48 BC,SLOPE,1,3,1, 2      $ 45 DEGREE FACE
   49 IEND
   50 KEND
   51 JLOOP,2
   52 BC,SLOPE,5,1,1, 6      $ END OF CASE
   53 JEND
   54 BC,UZ,1,1,1, 0,-7.365E-2
   55 BC,UZ,1,2,1, 0,-7.365E-2
   56 BC,UZ,1,3,1, 0,-7.365E-2
   57 BC,UZ,1,4,1, 0,-7.365E-2
   58 BC,UZ,1,5,1, 0,-7.365E-2
   59 BC,UZ,2,1,1, 0,-5.538E-2
   60 BC,UZ,2,3,1, 0,-5.538E-2
   61 BC,UZ,2,5,1, 0,-5.538E-2
   62 BC,UZ,3,1,1, 0,-3.607E-2
```

```
62 BC,UZ,3,1,1, 0.-3.692E-2
63 BC,UZ,3,2,1, 0.-3.692E-2
64 BC,UZ,3,3,1, 0.-3.692E-2
65 BC,UZ,3,4,1, 0.-3.692E-2
66 BC,UZ,3,5,1, 0.-3.692E-2
67 BC,UZ,4,1,1, 0.-1.046E-2
68 BC,UZ,4,3,1, 0.-1.046E-2
69 BC,UZ,4,5,1, 0.-1.046E-2
70 BC,UZ,5,1,1, 0.0
71 BC,UZ,5,2,1, 0.0
72 BC,UZ,5,3,1, 0.0
73 BC,UZ,5,4,1, 0.0
74 BC,UZ,5,5,1, 0.0
75 BC,UZ,1,1,9, 0.-.577E-2
76 BC,UZ,1,2,9, 0.-.799E-2
77 BC,UZ,1,3,9, 0.-1.036E-2
78 BC,UZ,1,4,9, 0.-1.342E-2
79 BC,UZ,1,5,9, 0.-1.436E-2
80 BC,UZ,2,1,9, 0.-.929E-2
81 BC,UZ,2,3,9, 0.-.859E-2
82 BC,UZ,2,5,9, 0.-1.189E-2
83 BC,UZ,3,1,9, 0.-.476E-2
84 BC,UZ,3,2,9, 0.-.946E-2
85 BC,UZ,3,3,9, 0.-.723E-2
86 BC,UZ,3,4,9, 0.-.932E-2
87 BC,UZ,3,5,9, 0.-1.019E-2
88 BC,UZ,4,1,9, 0.-.414E-2
89 BC,UZ,4,3,9, 0.-.522E-2
90 BC,UZ,4,5,9, 0.-.030E-2
91 BC,UZ,5,1,9, 0.-.362E-2
92 BC,UZ,5,2,9, 0.-.362E-2
93 BC,UZ,5,3,9, 0.-.362E-2
94 BC,UZ,5,4,9, 0.-.362E-2
95 BC,UZ,5,5,9, 0.-.362E-2
96 END,ELEMENTS
97 SOLVE
98 POST
99 BLOCK
100 OPTION,2
101 END,POST
102 REZONE,1,1,3, 3,3,9
103 REFINE,GRADS,1,1,3, 2,2,2
104 BCR,REZONE,1,1,3, 2,2,2,2,2,2, 1,1,3
105 END,CONTROL
106 SOLVE
107 POST
108 BLOCK
109 OPTION,2
110 END,POST
111 REZONE,1,1,3, 3,3,5
112 REFINE,GRADS,1,1,3, 2,2,2
113 BCR,REZONE,1,1,3, 2,2,2,2,2,2, 1,1,3
114 END,CONTROL
115 SOLVE
116 POST
117 BLOCK
118 OPTION,2
119 END,POST
120 STOP

TIME IN FFLO5B   =      .043 SECONDS
```

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ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST			SECOND			THIRD		
	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS

MATERIAL NUMBER = 1

SIGMA MAX	1 1 5	17	.531E+06	1 3 5	32	.531E+06	1 1 3	5	.353E+06
SIGMA MIN	1 1 5	16	-.726E+06	1 1 3	2	-.299E+06	1 1 3	37	-.259E+06
TAU MAX	1 3 3	20	.960E+02	1 3 3	23	.960E+02	1 1 3	8	.960E+02
EPS MAX	1 1 3	1	.197E+00	1 3 5	32	.194E+00	1 1 5	17	.194E+00
EPS MIN	1 1 5	16	-.253E+00	1 1 5	13	-.226E+00	1 1 3	8	-.226E+00
GAMMA MAX	1 1 5	13	.615E+00	1 1 3	8	.615E+00	1 3 3	23	.615E+00

TIME IN POST = 1.111 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 10

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 1

NODE	K J I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101	.968E+00	0.	.463E+01	11	30302	.116E+01	.221E+00	.463E+01
2	30103	.132E+01		.463E+00	12	30902	.905E+00	.924E-01	.463E+00
3	30303	.131E+01	.266E+00	.463E+00	13	40101	.106E+01	0.	.664E+00
4	30301	.961E+00	.103E+00	.463E+00	14	40103	.345E+01	0.	.640E+00
5	50101	.120E+01	0.	.854E+00	15	40303	.130E+01	.270E+00	.657E+01
6	50103	.151E+01	0.	.449E+00	16	40301	.105E+01	.196E+00	.644E+01
7	50303	.140E+01	.201E+00	.445E+00	17	50102	.136E+01	0.	.452E+01
8	50301	.113E+00	.213E+00	.802E+00	18	50203	.196E+00	.246E+00	.167E+00
9	30102	.113E+01	0.	.463E+00	19	50302	.129E+01	.247E+00	.647E+00
10	30203	.132E+01	.131E+00	.463E+00	20	50201	.117E+01	.116E+00	.805E+00

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ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST						SECOND						THIRD					
	ELEMENT			POINT NO.	STRESS		ELEMENT			POINT NO.	STRESS		ELEMENT			POINT NO.	STRESS	
	I	J	K				I	J	K				I	J	K			
MATERIAL NUMBER = 1																		
SIGMA MAX	3	3	3	57	.478E+04		3	3	5	78	.296E+04		3	1	3	62	.278E+04	
SIGMA MIN	1	3	5	35	-.379E+04		1	1	5	16	-.132E+04		1	3	3	21	-.185E+04	
TAU MAX	1	3	5	35	.960E+02		1	1	5	13	.534E+02		1	3	5	20	.634E+02	
EPS MAX	3	3	3	59	.290E+00		1	1	3	1	.197E+00		3	3	5	64	.103E+00	
EPS MIN	1	3	5	35	-.224E+00		1	1	5	13	-.176E+00		1	3	5	80	-.076E+00	
GAMMA MAX	1	3	5	35	.615E+00		1	1	5	13	.357E+00		1	3	5	28	.357E+00	

TIME IN POST   =   1.109 SECONDS
TIME IN STOP   =   65.505 SECONDS

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```
              MICOM SCOPE 3.4.2 MM SN 48 MXM R.D 14.27
15.25.04.MM2KPBM  FROM    /KP
15.25.04.IP  00000576 WORDS - FILE INPUT   , DC 00
15.25.06.MMEKP,T1000,CM200000,L1000.
15.25.06.7E41K10M0S 7200  A3 MACKETT     MM01
15.25.06.LIMIT(1000)
15.25.06.ATTACH(TEX30,KPXXXMM,IO=KPXXX,CY=3,MR=1)
15.25.06.DISPOSE(OUTPUT,*PRNT)
15.42.31.LDSET(PRESET=ZERO)
15.48.29.TEX30.
16.32.37. NON-FATAL ERROR(S) IN OVERLAY GEN.
16.44.10.    STOP
16.44.10.    05.591 CP SECONDS EXECUTION TIME
16.44.10.EXIT.
16.44.10.OP  00042000 WORDS - FILE OUTPUT , DC 40
16.44.10.MS    43000  WORDS (  336000 MAX USED)
16.44.10.CPA      92.547 SEC.        83.381 ADJ.
16.44.10.IO       90.194 SEC.        54.400 ADJ.
16.44.10.CM    9390.429 KWS.         95.103 ADJ.
16.44.10.PP     192.397 SEC.      DATE 18/18/77
16.44.10.EJ  END OF JOB, KP
```

MODEL II

The finite element model II is shown in Figure 5. It was analyzed for both pressure and thermal loading. The TEXGAP-3D computer input and output is shown on the following pages.

Pressure Loading - Firing at -65°F

Propellant	Case
E_p = 19,000 psi $\quad$ ν_p = 0.499	E_c = 3 x 10^7 psi $\quad$ ν_c = 0.3

pressure = 1425 psi
Corresponding end displacements are shown on computer
input and referenced to Figure 6.

Thermal Loading (2 Weeks Storage at -65°F)

Propellant	Case
E_p = 700 psi $\quad$ ν_p = 0.499 $\quad$ α_p = 0.000089 in/in/°F	E_c = 3 x 10^7 psi $\quad$ ν_c = 0.3

T_o = 140°F
Corresponding end displacements are shown on computer
input and referenced to Figure 6.

The results of two analyses on Model II are shown on the following
computer output sheets:

1) pressure loading with two sequential rezoning
    computations, without any repositioning of
    element nodal points;

2) thermal loading with two sequential rezoning
    computations, without any repositioning of
    element nodal points.

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The first analysis, with rezoning near the cylindrical bore end of the transition (see Figure 5), yielded a maximum strain of 0.0260 in element 113 (IJK). The second analysis, with rezoning near the cylindrical bore end, yielded a maximum strain of 0.235 in element 113.

The following results consist of abbreviated computer output for both the first and second analyses. The first analysis is contained on pages 111 thru 124; the second analysis is contained on pages 125 thru 131.

LINE   DIRECT LIST OF INPUT DATA

```
 1 SFINOCYL - STAR TO CYLINDRICAL BORE TRANSITION (II)
 2 SETUP,4,PRESCRIB
 3 ISO.PROPELLANT,1,1.9E4,.499
 4 ISO.CASE,2,3,E7,.3
 5 END.MATERIALS
 6 BLOCK-C,1, 1,1,1, 9,3,3  $PROPELLANT NODES
 7 .94,0,0, 2.447,0,0, 2.291,.86,0, .88,.33,0/
 8 .94,0,.463, 2.447,0,.463, 2.291,.86,.463, .88,.33,.463
 9 10,2.430,.292,0, 12,.913,.223,0, 18,2.430,.292,.463, 20,.913,.223,.463/
18 22,2.377,.500,0, 24,.933,.112,0, 30,2.377,.500,.463, 32,.933,.112,.463
11 BLOCK-C,1, 1,3,1, 5,5,3  $PROPELLANT NODES
12 .88,.33,0, 2.291,.86,0, 1.730,1.730,0, .009,.009,0/
13 .88,.33,.463, 2.291,.86,.463, 1.730,1.730,.463, .665,.665,.463
14 10,2.150,1.176,0, 12,.752,.559,0, 18,2.150,1.176,.463, 20,.752,.559,.463/
15 22,1.958,1.457,0, 24,.825,.452,0, 30,1.958,1.457,.463, 32,.825,.452,.463
16 BLOCK-C,1, 1,1,3, 9,3,7  $PROPELLANT NODES
17 .94,0,.463, 2.447,0,.463, 2.291,.86,.463, .88,.33,.463/
18 2.145,0,1.942, 2.447,0,1.942, 2.291,.86,1.942, .88,.33,1.942
19 10,2.430,.292,.463, 12,.913,.223,.463, 13,1.39,0,.963/
20 18,2.430,.292,1.942, 20,1.403,.33,1.942, 22,2.377,.500,.463/
21 24,.933,.112,.463, 25,1.79,0,1.363, 30,2.377,.500,1.942/
22 32,1.89,.33,1.942
23 BLOCK-C,1, 1,3,3, 5,5,7  $PROPELLANT NODES
24 .88,.33,.463, 2.291,.86,.463, 1.730,1.730,.463, .009,.009,.463/
25 .88,.33,1.942, 2.291,.86,1.942, 1.730,1.730,1.942, .665,.665,1.942
26 10,2.150,1.176,.463, 12,.752,.559,.463, 18,2.150,1.176,1.942/
27 20,.752,.559,1.942, 22,1.958,1.457,.463, 24,.825,.452,.463/
28 30,1.958,1.457,1.942, 32,.825,.452,1.942
29 BLOCK-C,1, 1,1,7, 5,3,9  $PROPELLANT NODES
30 2.145,0,1.942, 2.447,0,1.942, 2.291,.86,1.942, .88,.33,1.942/
31 2.145,0,2.405, 2.447,0,2.405, 2.291,.86,2.405, .88,.33,2.405
32 18,2.430,.292,1.942, 12,1.403,.33,1.942, 18,2.430,.292,2.405/
33 20,1.403,.33,2.405, 22,2.377,.500,1.942, 24,1.89,.33,1.942/
34 30,2.377,.500,2.405, 32,1.89,.33,2.405
35 BLOCK-C,1, 1,3,7, 5,5,9  $PROPELLANT NODES
36 .88,.33,1.942, 2.291,.86,1.942, 1.730,1.730,1.942, .665,.665,1.942/
37 .88,.33,2.405, 2.291,.86,2.405, 1.730,1.730,2.405, .665,.665,2.405
38 10,2.150,1.176,1.942, 12,.752,.559,1.942, 18,2.150,1.176,2.405/
39 20,.752,.559,2.405, 22,1.958,1.457,1.942, 24,.825,.452,1.942/
40 30,1.958,1.457,2.405, 32,.825,.452,2.405
41 BLOCK,2, 5,1,1, 7,3,3  $CASE NODES
42 2.447,0,0, 2.517,0,0, 2.517,20.56,0, 2.447,20.56,0/
43 2.447,0,.463, 2.517,0,.463, 2.517,20.56,.463, 2.447,20.56,.463
44 BLOCK,2, 5,3,1, 7,5,3  $CASE NODES
45 2.447,20.56,0, 2.517,20.56,0, 2.517,45,0, 2.447,45,0/
46 2.447,20.56,.463, 2.517,20.56,.463, 2.517,45,.463, 2.447,45,.463
47 BLOCK,2, 5,1,3, 7,3,7  $CASE NODES
48 2.447,0,.463, 2.517,0,.463, 2.517,20.56,.463, 2.447,20.56,.463/
49 2.447,0,1.942, 2.517,0,1.942, 2.517,20.56,1.942, 2.447,20.56,1.942
50 BLOCK,2, 5,3,3, 7,5,7  $CASE NODES
51 2.447,20.56,.463, 2.517,20.56,.463, 2.517,45,.463, 2.447,45,.463/
52 2.447,20.56,1.942, 2.517,20.56,1.942, 2.517,45,1.942, 2.447,45,1.942
53 BLOCK,2, 5,1,7, 7,3,9  $CASE NODES
54 2.447,0,1.942, 2.517,0,1.942, 2.517,20.56,1.942, 2.447,20.56,1.942/
55 2.447,0,2.405, 2.517,0,2.405, 2.517,20.56,2.405, 2.447,20.56,2.405
56 BLOCK,2, 5,3,7, 7,5,9  $CASE NODES
57 2.447,20.56,1.942, 2.517,20.56,1.942, 2.517,45,1.942, 2.447,45,1.942/
58 2.447,20.56,2.405, 2.517,20.56,2.405, 2.517,45,2.405, 2.447,45,2.405
59 END.GRID
60 KLOOP,4
61 ILOOP,2
62 JLOOP,2
```

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```
62 JLOOP,2
63 BRICKH,1, 1,1,1      $ PROPELLANT ELEMENTS
64 JEND
65 IEND
66 KEND
67 KLOOP,4
68 JLOOP,2
69 BRICK,2, 5,1,1      $ CASE ELEMENTS
70 JEND
71 KEND
72 KLOOP,4
73 ILOOP,3
74 BC,SLOPE,1,1,1, 9     $ 0 DEGREE FACE
75 BC,SLOPE,1,3,1, 2     $ 45 DEGREE FACE
76 IEND
77 KEND
78 JLOOP,2
79 BC,SLOPE,5,1,1, 6     $ END OF CASE
80 JEND
81 KLOOP,4
82 JLOOP,2
83 BC,PRESSURE, 1,1,1, 4,1.425E3      $ 1425 PSI PRESSURE
84 JEND
85 KEND
86 BC,UZ,1,1,1, 0,-2.184E-2
87 BC,UZ,1,2,1, 0,-2.184E-2
88 BC,UZ,1,3,1, 0,-2.184E-2
89 BC,UZ,1,4,1, 0,-2.184E-2
90 BC,UZ,1,5,1, 0,-2.184E-2
91 BC,UZ,2,1,1, 0,-1.638E-2
92 BC,UZ,2,3,1, 0,-1.638E-2
93 BC,UZ,2,5,1, 0,-1.638E-2
94 BC,UZ,3,1,1, 0,-1.092E-2
95 BC,UZ,3,2,1, 0,-1.092E-2
96 BC,UZ,3,3,1, 0,-1.092E-2
97 BC,UZ,3,4,1, 0,-1.092E-2
98 BC,UZ,3,5,1, 0,-1.092E-2
99 BC,UZ,4,1,1, 0,-0.546E-2
100 BC,UZ,4,3,1, 0,-0.546E-2
101 BC,UZ,4,5,1, 0,-0.546E-2
102 BC,UZ,5,1,1, 0,0.
103 BC,UZ,5,2,1, 0,0.
104 BC,UZ,5,3,1, 0,0.
105 BC,UZ,5,4,1, 0,0.
106 BC,UZ,5,5,1, 0,0.
107 BC,UZ,1,1,9, 0,-.215E-2
108 BC,UZ,1,2,9, 0,-.393E-2
109 BC,UZ,1,3,9, 0,-.462E-2
110 BC,UZ,1,4,9, 0,-.462E-2
111 BC,UZ,1,5,9, 0,-.462E-2
112 BC,UZ,2,1,9, 0,-.200E-2
113 BC,UZ,2,3,9, 0,-.384E-2
114 BC,UZ,2,5,9, 0,-.384E-2
115 BC,UZ,3,1,9, 0,-.184E-2
116 BC,UZ,3,2,9, 0,-.238E-2
117 BC,UZ,3,3,9, 0,-.341E-2
118 BC,UZ,3,4,9, 0,-.341E-2
119 BC,UZ,3,5,9, 0,-.341E-2
120 BC,UZ,4,1,9, 0,-.188E-2
121 BC,UZ,4,3,9, 0,-.238E-2
122 BC,UZ,4,5,9, 0,-.238E-2
123 BC,UZ,5,1,9, 0,-.153E-2
124 BC,UZ,5,2,9, 0,-.153E-2
125 BC,UZ,5,3,9, 0,-.153E-2
126 BC,UZ,5,4,9, 0,-.153E-2
127 BC,UZ,5,5,9, 0,-.153E-2
128 END ELEMENTS
```

```
128 END,ELEMENTS
129 SOLVE
130 POST
131 BLOCK
132 OPTION,2
133 END,POST
134 REZONE,1,1,3, 3,3,5
135 REFINE,GRADS,1,1,3, 2,2,2
136 BCR,REZONE,1,1,3, 2,2,2,2,2,2, 1,1,3
137 END,CONTROL
138 SOLVE
139 POST
140 BLOCK
141 OPTION,2
142 END,POST
143 REZONE,1,1,3, 3,3,5
144 REFINE,GRADS,1,1,3, 2,2,2
145 BCR,REZONE,1,1,3, 2,2,2,2,2,2, 1,1,3
146 END,CONTROL
147 SOLVE
148 POST
149 BLOCK
150 OPTION,2
151 END,POST
152 STOP

TIME IN FFLOS0    =    1.132 SECONDS
```

ELEMENT
NO. TYPE

NODES
I J K

NODAL POINT COORDINATES
X   Y   Z

1 BRICKH MATERIAL NO. 1

2 BRICKH MATERIAL NO. 1

3 BRICKH MATERIAL NO. 1

4 BRICKH MATERIAL NO. 1

5 BRICKH MATERIAL NO. 1

ELEMENT
NO. TYPE

NODES
I J K

NODAL POINT COORDINATES
X Y Z

NODES
I J K

NODAL POINT COORDINATES
X Y Z

11 BRICKH MATERIAL NO. 1

12 BRICKH MATERIAL NO. 1

13 BRICKH MATERIAL NO. 1

14 BRICKH MATERIAL NO. 1

15 BRICKH MATERIAL NO. 1

ELEMENT
NO. TYPE   NODES I J K   NODAL POINT COORDINATES X Y Z   NODES I J K   NODAL POINT COORDINATES X Y Z

16 BRICK MATERIAL NO. 1

17 BRICK MATERIAL NO. 2

18 BRICK MATERIAL NO. 2

19 BRICK MATERIAL NO. 2

20 BRICK MATERIAL NO. 2

ELEMENT
NO. TYPE

NODES
I J K

NODAL POINT COORDINATES
X Y Z

NODES
I J K

NODAL POINT COORDINATES
X Y Z

21 BRICK MATERIAL NO. 2

22 BRICK MATERIAL NO. 2

23 BRICK MATERIAL NO. 2

24 BRICK MATERIAL NO. 2

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BOLNDARY CONDITIONS.

ELEMENT NUMBER	ELEMENT I	J	K	TYPE	NODE OR FACE	VALUE			
1	1	1	1	UZ	3	-.1092E-01			
				UZ	10	-.1092E-01			
				UZ	2	-.1092E-01			
				UZ	11	-.1630E-01			
				UZ	9	-.1630E-01			
				UZ	4	-.2104E-01			
				UZ	12	-.2104E-01			
				UZ	1	-.2104E-01			
				PRESSURE	4	.1425E+04	.1425E+04	.1425E+04	.1425E+04
				SLCPE	5	0.			
2	1	3	1	UZ	3	-.1092E-01			
				UZ	10	-.1092E-01			
				UZ	11	-.1630E-01			
				UZ	4	-.2104E-01			
				UZ	12	-.2104E-01			
				FRESSURE	4	.1425E+04	.1425E+04	.1425E+04	.1425E+04
				SLOPE	2	0.			
3	3	1	1	UZ	3	0.			
				UZ	10	0.			
				UZ	2	0.			
				UZ	11	-.5469E-02			
				UZ	9	-.5460E-02			
				SLOFE	5	0.			
4	3	3	1	UZ	3	0.			
				UZ	10	0.			
				UZ	11	-.5460E-02			
				SLOPE	2	0.			
5	1	1	3	PPESSURE	4	.1425E+04	.1425E+04	.1425E+04	.1425E+04
				SLOFE	5	0.			
6	1	3	3	PPESSURE	4	.1425E+04	.1425E+04	.1425E+04	.1425E+04
				SLOPE	2	0.			
7	3	1	3	SLOFE	5	0.			
8	3	3	3	SLOFE	2	0.			
9	1	1	5	PRESSURE	4	.1425E+04	.1425E+04	.1425E+04	.1425E+04
				SLOPE	5	0.			
10	1	3	5	PPESSURE	4	.1425E+04	.1425E+04	.1425E+04	.1425E+04
				SLOPE	2	0.			
11	3	1	5	SLOFE	5	0.			
12	3	3	5	SLOPE	2	0.			
13	1	1	7	UZ	7	-.3418E-02			
				UZ	18	-.2300E-02			
				UZ	6	-.1845E-02			

BOUNDARY CONDITIONS.

ELEMENT NUMBER	ELEMENT I	J	K	TYPE	NODE OR FACE	VALUE			
13	1	1	7	UZ	19	-.3040E-02			
				UZ	17	-.2000E-02			
				UZ	6	-.4620E-02			
				UZ	20	-.3990E-02			
				UZ	5	-.2150E-02			
				PRESSURE	4	.1429E+04	.1429E+04	.1429E+04	.1429E+04
				SLOPE	5	0.			
14	1	3	7	UZ	7	-.3410E-02			
				UZ	18	-.3410E-02			
				UZ	19	-.3040E-02			
				UZ	6	-.4620E-02			
				UZ	20	-.4620E-02			
				PRESSURE	4	.1429E+04	.1429E+04	.1429E+04	.1429E+04
				SLOPE	2	0.			
15	3	1	7	UZ	7	-.1530E-02			
				UZ	18	-.1530E-02			
				UZ	6	-.1530E-02			
				UZ	19	-.2300E-02			
				UZ	17	-.1600E-02			
				SLOPE	5	0.			
16	3	3	7	UZ	7	-.1530E-02			
				UZ	18	-.1530E-02			
				UZ	19	-.2300E-02			
				SLOPE	2	0.			
17	5	1	1	SLOPE	6	0.			
				SLOPE	5	0.			
18	9	3	1	SLOPE	6	0.			
				SLOPE	2	0.			
19	5	1	3	SLOPE	5	0.			
20	5	3	3	SLOPE	2	0.			
21	5	1	5	SLOPE	5	0.			
22	5	3	5	SLOPE	2	0.			
23	5	1	7	SLOPE	5	0.			
24	5	3	7	SLOPE	2	0.			

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ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST					SECOND					THIRD			
	ELEMENT I J K	POINT NO.	STRESS		ELEMENT I J K	POINT NO.	STRESS		ELEMENT I J K	POINT NO.	STRESS			

MATERIAL NUMBER = 1

	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS
SIGMA MAX	1 1 3	41	-.790E+03	1 1 5	73	-.790E+03	1 1 1	5	-.800E+03
SIGMA MIN	3 1 1	20	-.160E+04	1 1 7	116	-.167E+04	3 3 1	30	-.166E+04
TAU MAX	1 1 3	41	.315E+03	1 1 5	73	.305E+03	1 1 3	37	.299E+03
EPS MAX	1 1 1	5	.246E-01	1 1 3	37	.246E-01	1 1 1	4	.289E-01
EPS MIN	1 1 3	41	-.327E-01	1 1 5	73	-.318E-01	1 1 3	37	-.266E-01
GAMMA MAX	1 1 3	41	.497E-01	1 1 5	73	.401E-01	1 1 3	37	.472E-01

MATERIAL NUMBER = 2

	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS
SIGMA MAX	5 3 7	209	.553E+05	5 3 7	210	.548E+05	5 3 1	155	.585E+05
SIGMA MIN	5 1 7	203	-.143E+05	5 1 7	206	-.129E+05	5 1 7	199	-.126E+05
TAU MAX	5 3 1	194	.291E+05	5 3 1	157	.290E+05	5 3 7	208	.200E+05
EPS MAX	5 3 1	156	.179E-02	5 3 1	154	.178E-02	5 3 1	155	.178E-02
EPS MIN	5 1 7	203	-.035E-03	5 1 7	199	-.005E-03	5 3 7	212	-.790E-03
GAMMA MAX	5 3 1	194	.252E-02	5 3 1	157	.251E-02	5 3 7	208	.249E-02

TIME IN POST = 3.099 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 16

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 5

NODE	K J I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101	.940E+00	0.	.463E+00	11	30302	.123E+01	.463E+00	.463E+00
2	30103	.169E+01	0.	.463E+00	12	30201	.925E+00	.168E+00	.463E+00
3	30303	.159E+01	.595E+00	.463E+00	13	40101	.127E+01	0.	.844E+00
4	30301	.880E+00	.330E+00	.463E+00	14	40103	.166E+01	0.	.833E+00
5	50101	.168E+01	0.	.116E+01	15	40303	.159E+01	.595E+00	.833E+00
6	50103		0.	.116E+01	16	40301		0.	.117E+01
7	50303	.159E+01	.595E+00	.120E+01	17	50102	.101E+01	0.	.117E+01
8	50301	.880E+00	.330E+00	.463E+00	18	50203	.166E+01	.348E+00	.119E+01
9	30102	.132E+01	0.	.463E+00	19	50302	.123E+01	.462E+00	.120E+01
10	30203	.167E+01	.382E+00	.463E+00	20	50201	.131E+01	.266E+00	.116E+01

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ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST			SECOND			THIRD		
	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS

MATERIAL NUMBER = 1

	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS
SIGMA MAX	1 1 5	17	.161E+05	1 3 5	32	.161E+05	3 1 3	38	.184E+05
SIGMA MIN	1 3 5	35	-.250E+05	1 1 5	14	-.164E+05	3 1 3	37	-.090E+06
TAU MAX	1 1 5	16	.315E+03	1 3 5	28	.307E+03	1 1 5	13	.307E+03
EPS MAX	1 1 3	1	.246E-01	1 1 3	4	.277E-01	1 3 3	19	.277E-01
EPS MIN	1 1 5	16	-.327E-01	1 1 3	13	-.293E-01	1 1 3	0	-.293E-01
GAMMA MAX	1 1 5 ,16		.097E-01	1 1 3	0	.084E-01	1 1 3	13	.084E-01

TIME IN POST = 1.135 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 18

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 1

NODE	K J I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101	.940E+00	0.	.463E+00	11	30302	.111E+01	.201E+00	.463E+01
2	30103	.132E+01	0.	.403E+00	12	30201	.906E+00	.860E-01	.105E+00
3	30303	.133E+01	.239E+00	.463E+00	13	40101	.110E+01	0.	.662E+00
4	30301	.929E+00	.164E+00	.463E+00	14	40103	.144E+01	0.	.695E+00
5	50101	.127E+01	0.	.044E+00	15	40303	.137E+01	.293E+00	.653E+00
6	50103	.157E+01	0.	.451E+00	16	40301	.102E+01	.192E+00	.699E+00
7	50303	.144E+01	.271E+00	.437E+00	17	50102	.142E+01	0.	.843E+00
8	50301	.112E+01	.117E+00	.094E+00	18	30203	.151E+01	.103E+00	.859E+00
9	30102	.113E+01	0.	.463E+00	19	50302	.126E+01	.246E+00	.730E+00
10	30203	.131E+01	.110E+01	.463E+00	20	50201	.126E+01	.121E+00	.842E+00

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST ELEMENT I J K	POINT NO.	STRESS	SECOND ELEMENT I J K	POINT NO.	STRESS	THIRD ELEMENT I J K	POINT NO.	STRESS
MATERIAL NUMBER = 1									
SIGMA MAX	3 3 3	57	.190E+C5	3 1 5	51	.113E+05	1 3 3	22	.986E+04
SIGMA MIN	3 3 5	70	-.369E+05	3 3 3	50	-.151E+05	1 3 3	21	-.151E+05
TAU MAX	1 3 5	35	.3C7E+C3	1 3 5	28	.300E+03	1 1 5	6	.30CE+03
EPS MAX	1 1 3	7	.260E-C1	3 1 3	44	.249E-01	1 1 3	1	.246E-01
EPS MIN	1 3 5	35	-.293E-C1	1 1 3	0	-.259E-01	1 1 5	13	-.259E-01
GAMMA MAX	1 3 5	35	.484E-C1	1 1 5	13	.473E-01	1 1 3	0	.473E-01

TIME IN POST = 1.142 SECONDS

TIME IN STOP = 80.468 SECONDS

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          MICOM SCOPE 3.4.2 MM SN 40 MXM R.O 14.27
15.27.28.MM3KP80  FROM    /KP
15.27.28.IP  00000704 WORDS -- FILE INPUT  , DC 88
15.27.28.MM3KP,T1000,CM200000,L1000.
15.27.29.7E41K18M05 7200  A3 MACKETT     8M81
15.27.30.LIMIT(1000)
15.27.30.ATTACH(TEX38,KPXXXMM,IC=KPXXX,CY=3,MP=1)
15.27.30.DISPOSE(OUTPUT,*PR=C)
15.43.20.LDSET(PRESET=ZERO)
15.43.21.TEX38.
16.33.12. NON-FATAL ERROR(S) IN OVERLAY GEN.
19.04.52.    STOP
19.04.52.    86.400 CP SECONDS EXECUTION TIME
19.04.52.EXIT.
19.04.52.OP  00044992 WORDS - FILE OUTPUT , DC 40
19.04.53.MS  46592  WORDS ( 344064 MAX USED)
19.04.53.CPA    93.411 SEC.      84.078 ADJ.
19.04.53.IO     90.680 SEC.      54.647 ADJ.
19.04.53.CM   9415.910 KWS.      95.769 ADJ.
19.04.55.PP    194.494 SEC.    DATE 10/20/77
19.04.53.EJ  END OF JOB, KP
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LINE    DIRECT LIST OF INPUT DATA

    1 SFINOCYL - STAR TO CYLINCRICAL BORE TRANSITION (II)
    2 SETUP,4,PRESCRIB
    3 ISO,PROPELLANT,1,,7F3,,499,-,019245
    4 ISO,CASE,2,3,E7,,3
    5 END,MATERIALS
    6 BLOCK-C,1, 1,1,1, 5,3,3   $PR(PELLANT NODES
    7 .94,0.0, 2.447,0.0, 2.291,.86,0, .88,.33,C/
    8 .94,0,.463, 2.446,0,.463, 2.291,.86,.463, .88,.33,.463
    9 1C,2.430,.292,0, 12,.913,.223,0, 18,2.430,.292,.463, 20,.913,.223,.463/
   10 22,2.377,.580,0, 24,.933,.112,0, 3C,2.377,.580,.463, 32,.933,.112,.463
   11 BLOCK-C,1, 1,3,1, 5,5,3   $PR(PELLANT NODES
   12 .88,.33,0, 2.291,.86,0, 1.739,1.730,0, .665,.665,0/
   13 .88,.33,.463, 2.291,.86,.463, 1.730,1.730,.463, .665,.665,.463
   14 1C,2.150,1.176,0, 12,.752,.559,0, 18,2.150,1.176,.463, 20,.752,.559,.463/
   15 22,1.958,1.457,0, 24,.825,.452,0, 30,1.958,1.457,.463, 32,.825,.452,.463
   16 BLOCK-C,1, 1,1,3, 5,3,7   $PROPELLANT NODES
   17 .94,0,.463, 2.447,0,.463, 2.291,.86,.463, .88,.33,.463/
   18 2.145,0,1.942, 2.447,0,1.942, 2.291,.86,1.942, .88,.33,1.942
   19 10,2.430,.292,.463, 12,.913,.223,.463, 13,1.39,0,.963/
   20 18,2.430,.292,1.942, 20,1.403,.33,1.942, 22,2.377,.580,.463/
   21 24,.933,.112,.463, 25,1.79,0,1.363, 30,2.377,.580,1.942/
   22 32,1.89,.33,1.942
   23 BLOCK-C,1, 1,3,3, 5,5,7   $PROPELLANT NODES
   24 .88,.33,.463, 2.291,.86,.463, 1.73(,1.73),.463, .665,.665,.463/
   25 .88,.33,1.942, 2.291,.86,1.942, 1.730,1.730,1.942, .665,.665,1.942
   26 10,2.150,1.176,.463, 12,.752,.559,.463, 18,2.150,1.176,1.942/
   27 20,.752,.559,1.942, 22,1.958,1.457,.463, 24,.825,.452,.463/
   28 30,1.958,1.457,1.942, 32,.825,.452,1.942
   29 BLOCK-C,1, 1,1,7, 5,3,9   $PROPELLANT NODES
   30 2.145,0,1.942, 2,447,0,1.542, 2.291,.86,1.942, .88,.33,1.942/
   31 2.145,0,2.405, 2.447,0,2.405, 2.291,86,2.405, .88,.33,2.405
   32 1C,2.430,.292,1.942, 12,1.403,.33,1.942, 18,2.430,.292,2.405/
   33 20,1.403,.33,2.405, 22,2.377,.580,1.942, 24,1.89,.33,1.942/
   34 30,2.377,.580,2.405, 32,1.89,.33,2.405
   35 BLOCK-C,1, 1,3,7, 5,5,9   $PROPELLANT NODES
   36 .89,.33,1.942, 2,291,.86,1.942, 1.730,1.730,1.942, .685,.685,1.942/
   37 .88,.33,2.405, 2.291,.86,2.405, 1.730,1.730,2.405, .665,.665,2.405
   38 10,2.150,1.176,1.942, 12,.752,.559,1.942, 18,2.150,1.176,2.405/
   39 20,.752,.559,2.405, 22,1.958,1.457,1.942, 24,.825,.452,1.942/
   40 30,1.958,1.457,2.405, 32,.825,.452,2.405
   41 BLOCK,2, 5,1,1, 7,3,3   $CASE NODES
   42 2.447,0,0, 2.517,0,0, 2.517,20.56,0, 2.447,20.56,0/
   43 2.447,0,.463, 2.517,0,.463, 2.517,20.56,.463, 2.447,20.56,.463
   44 BLOCK,2, 5,3,1, 7,5,3   $CASE NODES
   45 2.447,20.56,0, 2.517,20.56,0, 2.517,45,0, 2.447,45,0/
   46 2.447,20.56,.463, 2.517,20.56,.463, 2.517,45,.463, 2.447,45,.463
   47 BLOCK,2, 5,1,3, 7,3,7   $CASE NODES
   48 2.447,0,.463, 2.517,0,.463, 2.517,20.56,.463, 2.447,20.56,.463/
   49 2.447,0,1.942, 2.517,0,1.942, 2.517,20.56,1.942, 2.447,20.56,1.942
   50 BLOCK,2, 5,3,3, 7,5,7   $CASE NODES
   51 2.447,20.56,.463, 2.517,20.56,.463, 2.517,45,.463, 2.447,45,.463/
   52 2.447,20.56,1.942, 2.517,20.56,1.942, 2.517,45,1.942, 2.447,45,1.942
   53 BLOCK,2, 5,1,7, 7,3,9   $CASE NODES
   54 2.447,0,1.942, 2,517,0,1.942, 2.917,20.56,1.942, 2.447,20.56,1.942/
   55 2.447,0,2.405, 2.517,0,2.405, 2.517,20.56,2.405, 2.447,20.56,2.405
   56 BLOCK,2, 5,3,7, 7,5,9   $CASE NODES
   57 2.447,20.56,1.942, 2.517,20.56,1.942, 2.517,45,1.942, 2.447,45,1.942/
   58 2.447,20.56,2.405, 2.517,20.56,2.405, 2.517,45,2.405, 2.447,45,2.405
   59 END,GRID
   60 KLOOP,4
   61 ILOOP,2
   62 JLOOP,2
```

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```
62 JLOOP,2
63 BRICKH,1, 1,1,1    $ PROPELLANT ELEMENTS
64 JEND
65 IEND
66 KEND
67 KLOOP,4
68 JLOOP,2
69 BRICK,2, 5,1,1    $ CASE ELEMENTS
70 JEND
71 KEND
72 KLOOP,4
73 ILOOP,3
74 BC,SLOPE,1,1,1, 9    $ 0 DEGREE FACE
75 BC,SLOPE,1,3,1, 2    $ 45 DEGREE FACE
76 IEND
77 KEND
78 JLOOP,2
79 BC,SLOPE,5,1,1, 6    $ END OF CASE
80 JEND
81 BC,UZ,1,1,1, 0,-7.385E-2
82 BC,UZ,1,2,1, 0,-7.385E-2
83 BC,UZ,1,3,1, 0,-7.385E-2
84 BC,UZ,1,4,1, 0,-7.385E-2
85 BC,UZ,1,5,1, 0,-7.385E-2
86 BC,UZ,2,1,1, 0,-5.538E-2
87 BC,UZ,2,3,1, 0,-5.538E-2
88 BC,UZ,2,5,1, 0,-5.538E-2
89 BC,UZ,3,1,1, 0,-3.692E-2
90 BC,UZ,3,2,1, 0,-3.692E-2
91 BC,UZ,3,3,1, 0,-3.692E-2
92 BC,UZ,3,4,1, 0,-3.692E-2
93 BC,UZ,3,5,1, 0,-3.692E-2
94 BC,UZ,4,1,1, 0,-1.846E-2
95 BC,UZ,4,3,1, 0,-1.846E-2
96 BC,UZ,4,5,1, 0,-1.846E-2
97 BC,UZ,5,1,1, 0,0.
98 BC,UZ,5,2,1, 0,0.
99 BC,UZ,5,3,1, 0,0.
100 BC,UZ,5,4,1, 0,0.
101 BC,UZ,5,5,1, 0,0.
102 BC,UZ,1,1,9, 0,-.5977E-2
103 BC,UZ,1,2,9, 0,-1.064E-2
104 BC,UZ,1,3,9, 0,-1.436E-2
105 BC,UZ,1,4,9, 0,-1.436E-2
106 BC,UZ,1,5,9, 0,-1.436E-2
107 BC,UZ,2,1,9, 0,-.525E-2
108 BC,UZ,2,3,9, 0,-1.165E-2
109 BC,UZ,2,5,9, 0,-1.165E-2
110 BC,UZ,3,1,9, 0,-.478E-2
111 BC,UZ,3,2,9, 0,-.630E-2
112 BC,UZ,3,3,9, 0,-1.015E-2
113 BC,UZ,3,4,9, 0,-1.015E-2
114 BC,UZ,3,5,9, 0,-1.015E-2
115 BC,UZ,4,1,9, 0,-.414E-2
116 BC,UZ,4,3,9, 0,-.630E-2
117 BC,UZ,4,5,9, 0,-.630E-2
118 BC,UZ,5,1,9, 0,-.362E-2
119 BC,UZ,5,2,9, 0,-.362E-2
120 BC,UZ,5,3,9, 0,-.362E-2
121 BC,UZ,5,4,9, 0,-.362E-2
122 BC,UZ,5,5,9, 0,-.362E-2
123 END,ELEMENTS
124 SOLVE
125 POST
126 BLOCK
127 OPTION,2
128 END,POST
```

```
128 ENJ,PUST
129 REZONE,1,1,3, 3,3,3
130 REFINE,GRADS,1,1,3, 2,2,2
131 OCR,REZONE,1,1,3, 2,2,2,2,2,2, 1,1,3
132 END,CONTROL
133 SOLVE
134 POST
135 BLOCK
136 OPTICN,2
137 END,POST
138 REZONE,1,1,3, 3,3,3
139 REFINE,GRADS,1,1,3, 2,2,2
140 OCR,REZONE,1,1,3, 2,2,2,2,2,2, 1,1,3
141 END,CONTROL
142 SOLVE
143 POST
144 BLOCK
145 OPTION,2
146 END,POST
147 STOP

TIME IN FFLDSS    =      1.111 SECONDS
```

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST					SECOND					THIRD			
	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS

MATERIAL NUMBER = 1

	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS
SIGMA MAX	1	1	5	73	.225E+03	1	1	3	41	.225E+03	1	1	7	149	.200E+03
SIGMA MIN	1	1	7	116	-.930E+02	1	1	3	44	-.00E+02	1	1	5	76	-.76E+02
TAU MAX	1	1	3	41	.118E+03	1	1	5	73	.107E+03	1	1	5	77	.919E+02
EPS MAX	1	1	1	5	.211E+00	1	1	3	37	.211E+00	1	1	1	4	.103E+00
EPS MIN	1	1	3	41	-.291E+00	1	1	5	73	-.276E+00	1	1	3	77	-.226E+00
GAMMA MAX	1	1	3	41	.473E+00	1	1	5	73	.496E+00	1	1	5	77	.30E+00

MATERIAL NUMBER = 2

	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS	I	J	K	POINT NO.	STRESS
SIGMA MAX	5	3	7	213	.374E+05	5	3	7	209	.360E+05	5	3	7	210	.36E+05
SIGMA MIN	5	1	7	203	-.116E+06	5	1	7	206	-.116E+06	5	1	7	212	-.114E+06
TAU MAX	5	1	7	203	.640E+05	5	3	7	212	.677E+05	5	1	7	206	.686E+05
EPS MAX	5	1	7	203	.234E-02	5	3	7	212	.233E-02	5	1	7	206	.203E-02
EPS MIN	5	1	7	203	-.321E-02	5	3	7	212	-.318E-02	5	1	7	206	-.316E-02
GAMMA MAX	5	1	7	203	.555E-02	5	3	7	212	.552E-02	5	1	7	206	.552E-02

TIME IN POST = 3.009 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 16

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 5

NODE	K J I	X-COORD	Y-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101	.940E+00	0.	.463E+00	30302	11	.123E+01	.463E+00	.463E+00
2	30103	.164E+01	0.	.463E+00	30201	12	.929E+00	.160E+00	.463E+00
3	30303	.159E+01	.595E+03	.463E+00	40101	13	.127E+01	0.	.844E+00
4	30301	.808E+00	.330E+00	.463E+00	40103	14	.164E+01	0.	.839E+00
5	50101	.168E+01	0.	.116E+01	40103	15	.159E+01	.595E+00	.839E+00
6	50103	.282E+00	.595E+00	.116E-01	40101	16	.808E+00	.330E+00	.839E+00
7	50303	.159E+01	.595E+00	.120E+01	50102	17	.101E+01	0.	.117E+01
8	50301	.808E+00	.330E+00	.120E+01	50203	18	.164E+01	.360E+00	.119E+01
9	30102	.132E+01	0.	.463E+00	50302	19	.123E+01	.442E+00	.120E+01
10	30203	.167E+01	.202E+00	.463E+00	50201	20	.131E+01	.266E+00	.116E+01

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	FIRST				SECOND				THIRD		
	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS

MATERIAL NUMBER = 1

	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS	ELEMENT I J K	POINT NO.	STRESS
SIGMA MAX	1 3 5	32	.568E+06	1 1 5	17	.568E+06	3 1 3	38	.362E+06
SIGMA MIN	1 3 5	35	-.002E+06	1 1 5	16	-.607E+06	1 1 3	2	-.206E+06
TAU MAX	1 1 5	16	.110E+03	1 3 3	23	.100E+03	1 3 3	28	.108E+03
EPS MAX	1 1 3	1	.211E+00	1 1 3	4	.193E+00	1 3 3	19	.103E+00
EPS MIN	1 1 5	16	-.251E+00	1 3 5	20	-.244E-0C	1 3 7	23	-.244E+00
GAMMA MAX	1 1 5	1	.473E+00	1 3 5	28	.29E+00	1 1	17	.29E+01

TIME IN POST = 1.128 SECONDS

MAXIMUM NUMBER OF COARSE GRID ELEMENTS POSSIBLE = 15

MAXIMUM DIMENSION OF REFINED GRID = 1331

MAXIMUM NUMBER OF GRID POINTS IN ANY ONE DIRECTION = 15

COARSE GRID ELEMENT = 1

NODE	K J I	X-COORD	A-COORD	Z-COORD	NODE	K J I	X-COORD	Y-COORD	Z-COORD
1	30101	.960E+03	0.	.463E+00	11	30302	.111E+01	.201E+00	.463E+00
2	30103	.132E+01		.463E+00	12	30201	.908E+00	.906E-01	.463E+00
3	30303	.130E+01	.235E+00	.463E+00	13	40101	.110E+01	0.	.463E+00
4	30301	.929E+00	.168E+00	.463E+00	14	40103	.144E+01	0.	.656E+00
5	50101	.127E+01	0.	.044E+00	15	40303	.127E+01	.253E+00	.656E+00
6	50103	.157E+01	0.	.061E+00	16	40301	.102E+01	.192E+00	.656E+00
7	50303	.144E+01	.271E+00	.037E+00	17	50102	.142E+01	0.	.043E+00
8	50301	.112E+01	.217E+00	.037E+00	18	30103	.131E+01	.198E+00	.463E+00
9	30102	.113E+01	0.	.463E+00	19	30302	.126E+01	.246E+00	.636E+00
10	30203	.131E+01	.110E+00	.463E+00	20	30203	.120E+01	.121E+00	.642E+00

ELEMENT SUMMARY REPORT

THREE MOST HIGHLY STRESSED ELEMENTS

	/---------FIRST---------					/--------SECOND--------					/---------THIRD---------				
	ELEMENT			POINT	STRESS	ELEMENT			POINT	STRESS	ELEMENT			POINT	STRESS
	I	J	K	NO.		I	J	K	NO.		I	J	K	NO.	
MATERIAL NUMBER = 1															
SIGMA MAX	3	3	3	57	.662E+04	3	1	5	51	.629E+04	1	3	3	22	.202E+04
SIGMA MIN	3	3	5	70	-.118E+05	3	3	3	50	-.616E+04	1	3	3	21	-.616E+04
TAU MAX	1	3	5	35	.108E+03	1	3	3	23	.933E+02	1	3	5	24	.933E+02
EPS MAX	1	1	3	7	.235E+00	3	1	3	44	.225E+00	1	3	1	1	.211E+00
EPS MIN	1	3	5	35	-.244E+00	1	1	5	13	-.203E+00	1	3	5	26	-.203E+00
GAMMA MAX	1	3	5	35	.629E+00	1	1	5	13	.390E+00	1	1	5	0	.390E+00

TIME IN POST = 1.190 SECONDS

TIME IN STOP = 30.190 SECONDS

```
           MICOM SCOPE 3.4.2 MM SN 49 MXM P.O 14.27
15.30.24.MM KPBR  FROP    /KP
15.30.24.IP  00000704 WORDS - FILE INPUT  , DC 00
15.30.24.MM KP,T1000,CM200000,L1000.
15.30.25.7E61K10M05 7200  AJ HACKETT    BM01
15.30.26.LIMIT(1000)
15.30.26.ATTACH(TEX3B,KPXXXMM,IC=KPXXX,CY=3,MP=1)
15.30.26.DISPOSE(OUTPUT,*PR=C)
15.44.25.LDSET(PRESET=ZERO)
15.44.25.TEX3B.
16.31.53. NON-FATAL ERROR(S) IN OVERLAY GEN.
19.06.51.    STOP
19.06.51.    06.173 CP SECONDS EXECUTION TIME
19.06.51.EXIT.
19.06.51.OP  00044064 WORDS - FILE OUTPLT , DC 40
19.06.51.MS  46592 WORDS ( 344064 MAX USED)
19.06.51.CPA    93.278 SEC.     83.959 ADJ.
19.06.51.IO     96.212 SEC.     54.428 ADJ.
19.06.51.CM  9386.892 KWS.      95.473 ADJ.
19.06.51.PP   197.300 SEC.    DATE 10/10/77
19.06.51.EJ  END OF JOB, KP
```
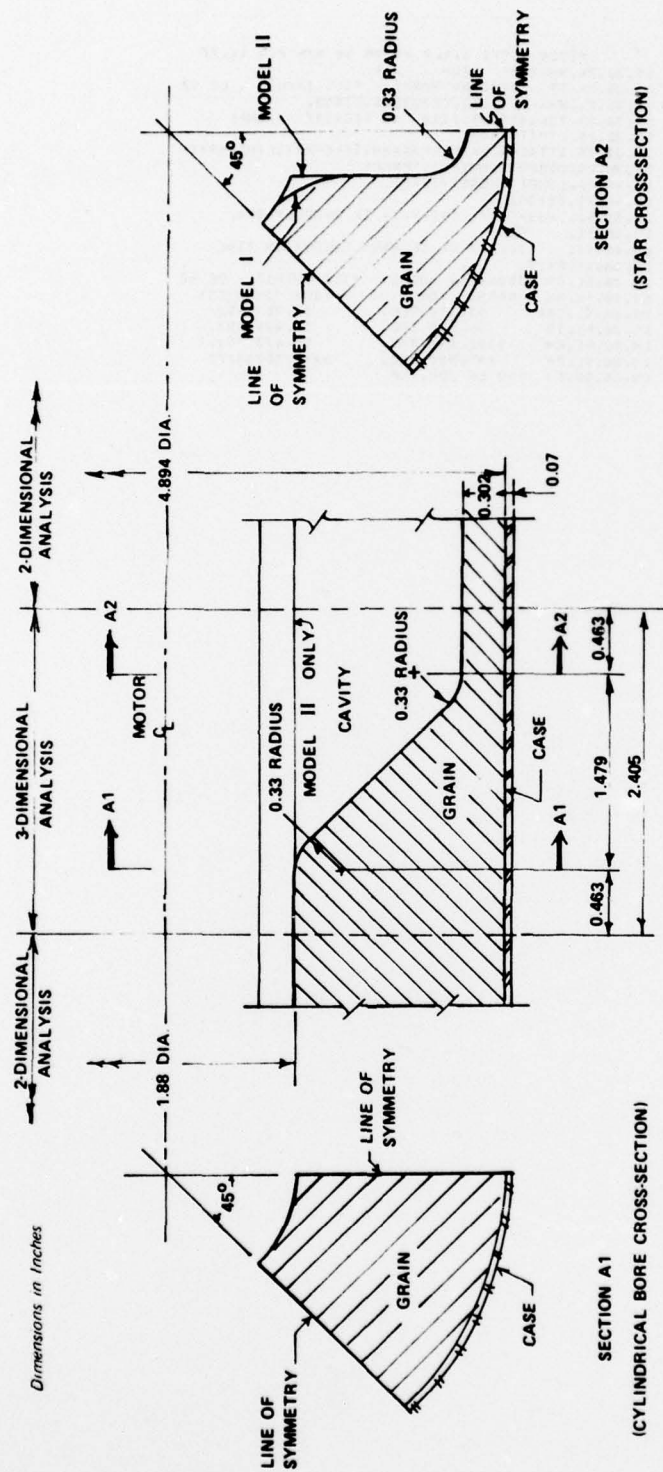
131

Figure 1. Star to Cylindrical Bore Transition Region (45° Segment)
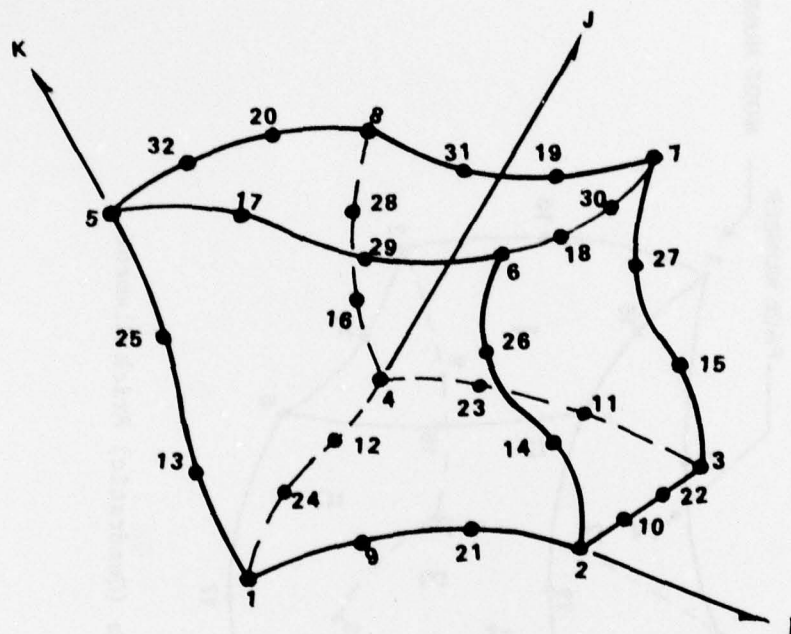
132

Figure 2.   Cubic Grid Generation Block

The eight corner points must be input (1 thru 8).
Points 9 thru 32 not specified are located auto-
matically by linear interpolation between corners.
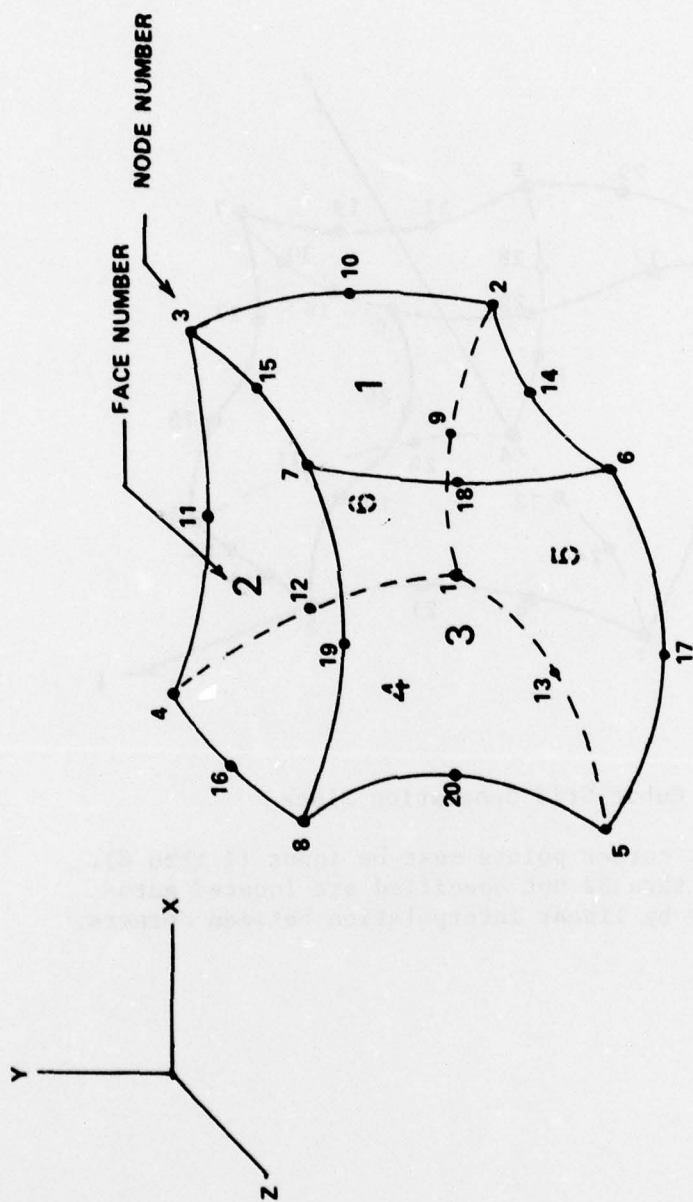
133

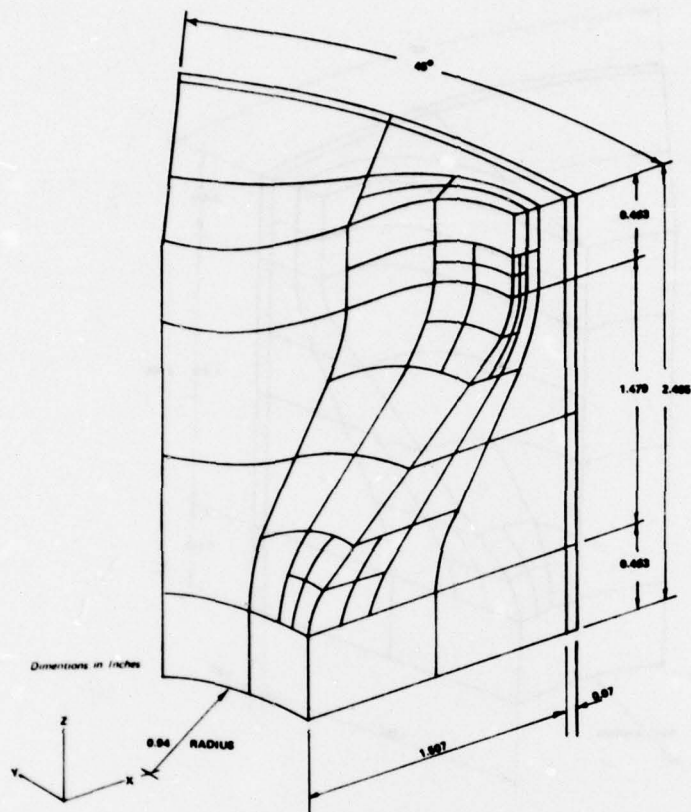Figure 3. 20 Node (Quadratic) Brick Element

Figure 4.   Finite Element Model of Star to Cylindrical
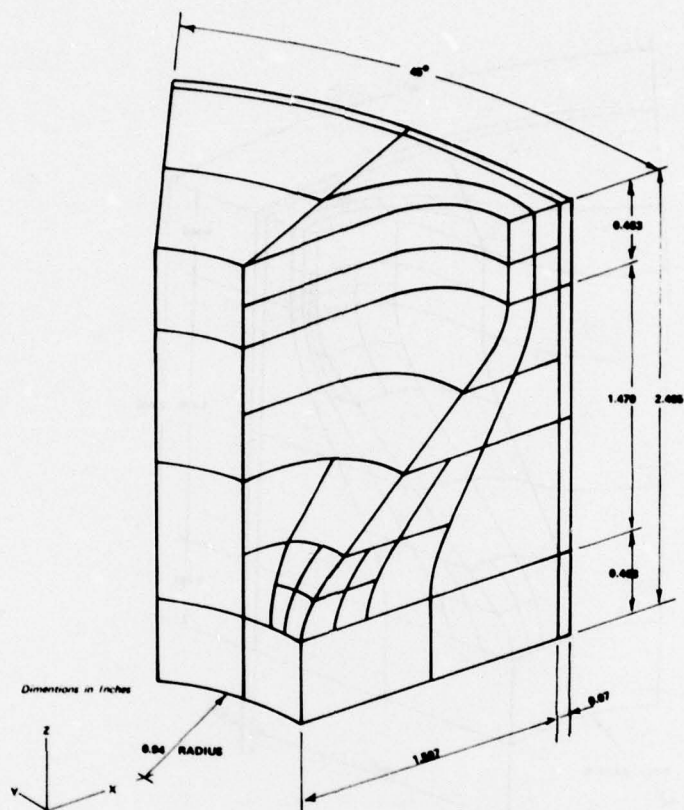   Bore Transition (I)

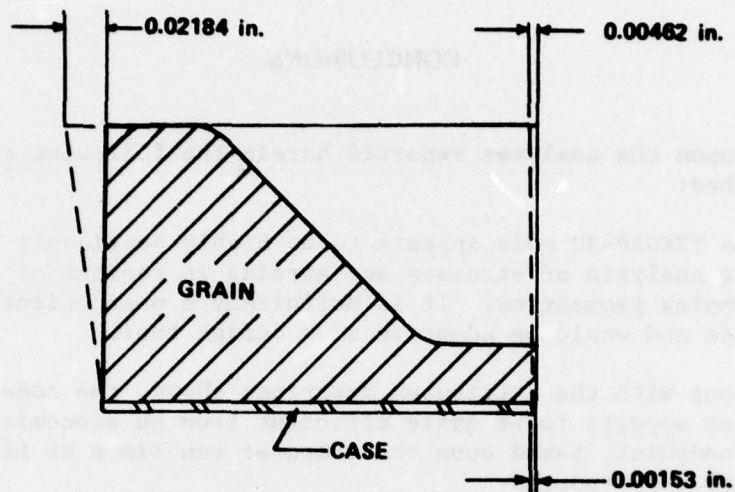Figure 5.   Finite Element Model of Star to Cylindrical
            Bore Transition (II)

0.02184 in.   0.00462 in.

GRAIN

CASE

0.00153 in.

a) PRESSURE LOADING CONDITION

0.07385 in.   0.01436 in.

GRAIN

CASE

0.00362 in.
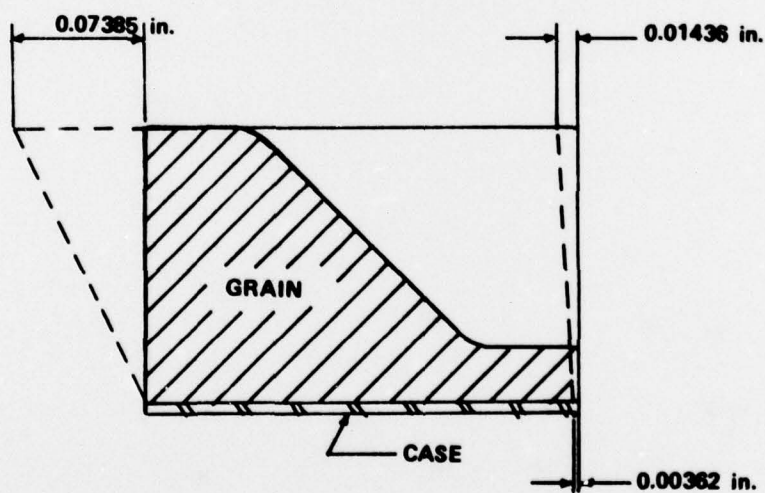
b) THERMAL LOADING CONDITION

Figure 6.   Grain Transition Interface Displacements
(From Previous Two-Dimensional Analyses)

CONCLUSIONS

Based upon the analyses reported herein the following conclusions can be reached:

1) The TEXGAP-3D code appears to be highly applicable to the analysis of stresses and strains in regions of complex geometrics. It is definitely a user oriented code and would be adaptive as a design tool.

2) Along with the attributes described above, the code also appears to be quite efficient from an economic standpoint, based upon the computer run times of the analyses reported.

REFERENCES

1. Engineering Analysis of Selected Advanced Propulsion Concepts - III, Technical Report RK-CR-76, US Army Missile Command, Redstone Arsenal, Alabama, September 1976.

2. E. B. Becker and R. S. Dunham, "TEXGAP-3D - A User Oriented Three-Dimentional Static Linear Elastic Stress Analysis Program", Vol. I, March 1977.

3. E. B. Becker and R. S. Dunham, "TEXGAP-3D - A User Oriented Three-Dimensional Static Linear Elastic Stress Analysis Program", Vol. II, March 1977.

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